

Railway Age

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A Still Greater Railway Age

THE RAILWAY REVIEW, published weekly in Chicago for more than fifty-eight years, has been merged with the *Railway Age*, effective with this issue. The story can best be told by reprinting the following editorial from the final issue of the former publication—December 25, 1926:

Au Revoir!

"This is the last time that the RAILWAY REVIEW will appear. With the January 1, 1927, issue of the *Railway Age*, it will be merged with that publication.

"The RAILWAY REVIEW has been published weekly in Chicago since May 7, 1868. As first issued, it was designated CHICAGO RAILWAY REVIEW, the name being changed to RAILWAY REVIEW in June, 1879. Between April 3, 1897, and December 27, 1913, it bore the title RAILWAY AND ENGINEERING REVIEW.

"The *Railway Age* as at present constituted was originally the WESTERN RAILROAD GAZETTE, founded in Chicago in 1856. On April 1, 1870, the name was changed to RAILROAD GAZETTE and it continued to be printed in that city until its office was destroyed in the great fire of October 8-9, 1871, when the owners boarded a train for New York and resumed publication there the following week without missing an issue. Later, in January, 1876, another weekly was born in Chicago—the RAILWAY AGE—which, on September 19, 1891, was merged with the NORTHWESTERN RAILROADER, of St. Paul, Minnesota. Between that time and April 26, 1901, the RAILWAY AGE was entitled RAILWAY AGE AND NORTHWESTERN RAILROADER, the shorter name being restored on May 3, 1901. In May, 1908, the publisher of the RAILROAD GAZETTE bought the RAILWAY AGE; and on June 5, 1908, the two were combined under the name RAILROAD AGE GAZETTE, which in January, 1910, was changed to RAILWAY AGE GAZETTE. On January 4, 1918, the 'GAZETTE' was finally dropped and since then the paper has been published under its present name.

"The principal merger (that of the RAILROAD GAZETTE and RAILWAY AGE in June, 1908) was for the purpose of giving greater service to subscriber and advertiser alike by a combination of effort and avoidance of wasteful duplication. Up to this time both the RAILROAD GAZETTE and RAILWAY AGE had covered

every department of steam railroading within one set of covers. There existed also a few monthly papers which specialized on departmental matters; but they had not thrived because in the main the higher officers 'ran' the railways in every sense of the word and there was but one audience from the point of view of both publisher and advertiser. Gradually, however, conditions changed; and what was happening in the lives of individuals and commercial corporations spread to the railways, with the result that now they, too, have become specialists in that each of the several major subdivisions of railway operation and maintenance is in itself a complete and powerful unit with just enough overlap to insure perfect contact. Thus there are today in the railway field several audiences, each with a language of its own, and each, therefore, demanding separate literature.

"As specialization spread in the field, so expanded the efforts of 'The House of Transportation'; with the result that the complexion of the *Railway Age* changed as the publisher bought and enlarged one after another monthlies, devoted respectively to the Signal (1910); Mechanical (1911); Electrical (1915); and Engineering and Maintenance (1916) departments. The result was one great weekly covering every phase of railroading from the viewpoint of executive and other officials who are more concerned with the subject in its broader aspects, and four highly specialized monthlies, each of comparable importance.

"With the new trend in full swing it was inevitable that any paper, irrespective of its value, which continued to parallel in the railway field the general practitioner in the fields of medicine or law, for example, could not hope to avoid a gradual loss of standing. The RAILWAY REVIEW, in an effort to meet changed conditions, put out a 'Monthly Extension Issue.' It was heroic—but there it ended. Even with a costly free circulation, in itself a mistake, it could not compete with the well established and splendidly edited monthlies of 'The House of Transportation.' It was but natural, therefore, that the publisher of the RAILWAY REVIEW should decide that the interests of the more than seven thousand subscribers of that paper, ranging all the way from chief executive officer down to employee, as well as those of a considerable number of substantial advertisers, would be best served by joining hands with the publisher of

the *Railway Age*. Hence the physical amalgamation of the two papers.

"There can be but one result—a still greater *Railway Age*, and better service to the subordinate railway officers through the four monthlies, amongst which will be distributed eventually some of the regular subscribers to the RAILWAY REVIEW and in which will be incorporated features in the RAILWAY REVIEW which have appealed to those classes of railway men who should really read the more highly specialized papers."

Novel Presentation at Railway Club Meeting

A NEW method of presenting a technical subject was attempted at the December meeting of the Western Railway Club, as described on another page of this issue, and its complete success was evidenced by the keen interest with which 400 members and guests of the club followed the paper. W. E. Woodard, vice-president of the Lima Locomotive Works, Inc., analyzed the application of engineering principles to locomotive development in this country, by far the greater proportion of his address being "put across" to the audience by means of moving pictures and "animated" drawings and charts. To a great extent Mr. Woodard allowed the pictures to tell the whole story, and this method of presentation enabled a large amount of information to be given in a short time. In fact, it is impossible to include in a written report of the meeting more than a fractional part of the data shown in the moving pictures, and no printed word can make the impression that the action pictures did. It is confidently expected that this method of presenting a strictly technical, and in some senses a dry subject, will be more extensively used in the future. The final point in Mr. Woodard's paper deserves the most serious consideration of railroad officers. The modern locomotive is capable of an output of 100,000 gross ton-miles per hour, at a coal rate of 3 lb. per draw-bar horsepower hour. An analysis of motive power in this country indicates that 61½ per cent of the freight locomotives have a capacity of but 45,000 gross ton-miles per hour, at a coal rate of 6½ lb. per draw-bar horsepower hour, and 31½ per cent, an output of 60,000 gross ton-miles per hour, at 5½ lb. of coal per draw-bar horsepower hour.

The Benefits of Train Control

ONLY 3.2 per cent of the accidental deaths of non-trespassers resulting from train accidents and train service accidents on the railroads of the United States during 1925 would have been preventable by train control, according to the statement of G. E. Ellis, secretary of the Automatic Train Control Committee of the American Railway Association, who presented a paper recently on the history and development of train control before the New England Railroad Club in Boston, Mass. Mr. Ellis, therefore, concludes that the adoption of train control on a large mileage would not greatly decrease the risk of death. Train control offers potential benefits from an operating standpoint, but in order to make these available certain changes in operating practices are required which all roads may not now be willing to undertake. For example, according to Mr. Ellis, the use of train control would permit the elimination of more train stops at automatic or "stop and proceed"

signals than would at first be thought possible. This is being done by train control with the aid of speed controllers on one installation. Stops at such automatic signals are avoided, the train merely being required to reduce the speed to that required by the apparatus and then proceeding under that control until the restriction is automatically removed. The use of cab signals to permit the elimination of wayside intermediate automatic signals was also suggested as offering advantages in train operation. These comments from a man of Mr. Ellis' position and experience should receive due consideration by the railroads. Train control may or may not be justified from the standpoint of safety. However, with about 15,000 track miles and over 5,750 locomotives equipped with train control, representing an expenditure well over \$25,000,000, it behooves the railroads to take advantage of such operating benefits as may be available.

Is There a Formula for Successful Leadership?

IT is a difficult task to try to formulate rules for successful leadership. Many outstanding leaders of men will frankly admit that they do not know just what principles guide them to success. Others of equal achievement who will tell the principles which have governed them may often overlook the most important elements in their success. Know your job; be honest; deal squarely with your men—these are fundamentals, all doubtless sound, which one often hears in this connection. But are they sufficient? Several years ago in a small shop a car repairer, an excellent all-round workman, was promoted to a foremanship. He certainly knew his job; he was honest; he was square. But he failed utterly as a foreman, for the reason that he would not let his men do anything on their own initiative. Their work, unless done under his supervision in the most minute detail, was never satisfactory. Consequently the men lost all interest in their work. Treat a man as though you thought him without intelligence and he will soon act as you expect him to. Conversely, often a sluggard will be spurred on to achievement by the knowledge that some one has confidence in him. Naturally, this foreman was soon back repairing cars and his place was taken by a young man who was equally honest and square, who knew car work perhaps not quite as well as his predecessor but well enough, and who had the additional quality of crediting his men with some ability and some pride in their work. Indeed he often appeared to assume these qualities in men who did not have them.

The Invaluable 41 Per Cent

OF the 63,939 stockholders of the New York Central, 26,704, or 41 per cent, are employees of that road or its subsidiaries, including the Michigan Central, the Big Four, and the Pittsburgh & Lake Erie. These employees have purchased 62,650 shares of Central stock of a par value of \$6,265,000. That 41 per cent of its stockholders is an invaluable asset to the New York Central. Those 26,000 employees are men and women in whose hands lies a large part of the success of the road. It is human nature to work harder for one's self than for any one else. Those employees are working for themselves. They know it, and the effect is undoubtedly apparent. It is to the credit of the New York

Central that it has made possible such a wide ownership of its valuable securities by its employees through its partial payment plan. It is also to its credit that it arranged at a special stockholders' meeting in September to set aside 200,000 additional shares of stock for future offerings to employees on the same basis. The benefits of these arrangements will accrue to the employees as well as to the New York Central itself. That is what makes employee ownership of securities of this sort so worth while and commendable.

Educating for Safety

THE Safety Section of the American Railway Association projected a great achievement when in 1925 it started a campaign to reduce railway accidents 35 per cent within five years. Not much progress has yet been made on most roads toward this goal. Definite planning is required to increase safety, as it is to attain any important objective. Those who make plans and those delegated to carry them out must be imbued with enthusiasm. On a railway these include all officers and employees. Safety is increased only when the entire personnel, from president to track laborer, strives for it.

The Committee of Direction of the Safety Section, of which T. H. Carrow of the Pennsylvania is chairman, recently has submitted to the individual railways one important part of a definite plan. In a circular it has recommended the inauguration of "safety instruction schools" or their equivalent for foremen and other supervisory officers, including assistant staff officers on each division or at each shop. It urges that schools be established as soon as suitable arrangements can be made and that the first course be completed on or before April 1, 1927. The circular is quoted elsewhere in this issue.

The railways have about 35,000 officers or employees who constitute the "supervisory forces." They include trainmasters, road foremen of engines, yardmasters, general foremen, assistant general foremen, gang foremen. They are the backbone of the railroad organization. The general and divisional officers transmit plans, purposes and enthusiasm through them to the employees in all departments. With a supervisory force composed of the right kind of men, and with these men properly organized and adequately educated regarding methods and objectives, and inspired with enthusiasm, a railway management can achieve astonishing things. The increase in the efficiency of operation within recent years is proof of this.

"Everybody who knows anything about accident prevention knows it is a matter of what is called supervision," says a railway officer who has given many years of study to the subject, "and if an honest-to-God foreman revival on the matter were developed and the interest maintained on every road and in every shop and gang, with plenty of support from all the way up, a 35 per cent reduction in 1927 compared with 1923 would be a cinch." The churches know that a "revival" which inspires men to desire to live better, but does not inculcate definite lessons in right-living and subsequently afford constant incentives to it, will have only ephemeral effects. The Safety Section has proposed the inauguration of "safety instruction schools" not only to imbue the supervisory forces with an intenser desire to increase safety, but also to broadcast information regarding the best methods of doing so.

The large reduction of accidents on the railways within the last fifteen years has been due partly to improvements in plants, but much more to organized effort by the

personnel. The "Safety First" movement which began in 1910 was directed much more to reducing man failures than plant failures. That is why it accomplished so much. A great majority of accidents are still due to man failures. They can be reduced only by more careful conduct by employees, which can be brought about only by better supervision of employees. This must be exercised by the supervisory forces.

How many railways will promptly act on the suggestion of the Committee of Direction of the Safety Section? How many, if they do not act on it, will inaugurate other and new methods for the accomplishment of the same purpose? The accident record of most roads can still be greatly improved. The Safety Section, representing practically all the railways, has said in effect that accidents can be reduced 35 per cent by the end of 1930. It will not reflect credit on the railways if they fail to accomplish what those who speak for them on this subject have said they can.

New Developments in the Proportioning of Concrete

ABOUT fifteen years ago attention was first directed to the loss of strength resulting from the use of excessive amounts of water in mixing concrete. This thought, as first advanced, was based primarily on observation; later it was confirmed by tests showing the direct relation between the quantity of mixing water and the strength of the concrete, and finally it was established on a rigid basis by the discovery of the water-cement ratio.

While the application of this principle in the proportioning of concrete has been thoroughly demonstrated by its practical application in the making of large yardages of concrete, notably on important railway projects, its general application has been retarded by the rather complex procedure which had been developed for this purpose. In other words, the procedure provided an analytical method which would take into account all of the variations in the materials to give the required proportions of cement, water and aggregates for a desired compressive strength. While this method proved rigidly correct, it was complicated and many users of concrete have been reluctant to depart from the simple 1-2-4 proportions which have been in vogue for many years.

However, more recent studies have shown that these refinements are unnecessary. It has been demonstrated that with sound, clean aggregate, the only factors affecting strength are the water-cement ratio and the workability of the concrete. Therefore, with rigid adherence to the ratio of the water to the cement, the only influence of the proportions of aggregate used, so far as strength is concerned, is the effect which these proportions have on the workability or consistency of the mixed concrete. These proportions can be determined by trial with sufficient accuracy to obtain the desired strength. Further refinement of proportions is primarily of value as it affects the yield,—that is, the maximum amount of aggregate that can be used with a given quantity of cement and still retain the desired strength. Such refinement is of no particular importance in cases where the volume of concrete is small. On the large projects involving a great quantity of concrete, special pains taken to determine the most economical proportions will pay well and should involve no administrative difficulty.

Taxes Increase More Than Total Earnings

WHEN the complete record of 1926 is made up it will show that the increase in the annual taxes of the railways has been greater within the last three years than the increase in their annual total earnings. This will be true in spite of the fact that the freight business handled in 1926 will have been much larger than in any previous year. Since the public pays rates to the railways and the railways pay taxes to the public, the result will be that the net cost of railway transportation to the public will be less than in 1923. The increase in the taxes of the Class I roads in the first ten months of 1926 over the corresponding months of 1923 was \$51,300,000. The increase in their total earnings, was only \$29,800,000, the excess of the increase in taxes over that in total earnings, therefore, representing a net gain to the public of about \$21,500,000.

The failure of total earnings to expand more during these three years has been due to various causes. While freight business has largely increased, passenger business has declined. Average freight and passenger rates also have declined. Some of those who have read so much about the increased prosperity of the railways may wonder where their enlarged net operating income has come from. With taxes increasing more than earnings, it had to come, if at all, from economies in operation. Operating expenses of Class I roads in the first ten months of this year were about \$242,500,000 less than in the corresponding months of 1923, and in addition, the debit balance of equipment rentals was about \$10,000,000 less.

The taxes of all industries and classes of people, like those of the railways, have been increasing, but it would be interesting to know if any other industries have had to bear a three years' augmentation of their taxes exceeding the increases in their total earnings.

"Increasing Wages and Declining Rates"

THE *Railway Age*, in a recent editorial on the wage award to conductors and trainmen of eastern railways, said: "There are three classes that are directly interested in railway operation. Under efficient operation the benefits of the resulting economies should be so divided that security owners will receive a fair return, employees will receive fair and increasing wages and the public will receive fair and declining rates." Slason Thompson, who sometimes enlightens and sometimes darkens counsel with his lucubrations, indicts us for these statements on two counts. The first is, that to provide better service "with 'fair and increasing wages' and 'fair and declining rates' is a paradox that would puzzle John D. Rockefeller or make James J. Hill chuckle in his grave."

The dictionary says a paradox is "a proposition which at first view seems at variance with common sense, but which on investigation may appear to be well founded." There has been, since 1923, an increase in the average wage per employee that would have added about \$50,000,000 to the pay roll this year if there had not been meantime a reduction in the number of employees. Taxes also have increased. The average freight and passenger rates have declined since 1923 to an extent that would have reduced total annual earnings more than

100 million dollars if freight business had not increased. Nevertheless, net operating income has increased; and the public has got improved service. The "paradox" merely stated as possible what actually has occurred as a result of increased economy of operation attained largely by a huge investment of capital which, in turn, has been made possible by the prospect, already to a substantial extent realized, of an increase in net return.

Second, Mr. Thompson indicts us for not mentioning among the classes "directly interested in railway operation" the manufacturers of railway equipment and supplies. They are interested and affected indirectly, not "directly." The railways are their market. Their prosperity is dependent on having a good market. Whether they have it usually depends on the prosperity of the railways. They are not, however, always directly benefited, as are the other three classes mentioned by us, by an increase in the efficiency of railway operation. Equipment manufacturers know that the great increase in efficiency of operation within recent years has actually, although temporarily, restricted their market. "What the railways need," says Mr. Thompson, "is a period of increasing traffic and stable rates and wages." Undoubtedly we deprecated the amount of the wage award made because it tends to upset present comparatively stable conditions, and to give employees relatively too large a part of those benefits of efficiency of operation which should be equitably divided between all the classes concerned.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian,
Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

How Dividend Checks Spread Happiness in Many Lands. A frequently asked question is "Who owns the railroads and where do the owners live?" an answer to which for the Pennsylvania Railroad is contained in the issue of its Information, dated Dec. 17, 1926. 4 p. Pub. by Pennsylvania Railroad, Philadelphia. Apply.

Official Register of the United States, 1926, compiled by Bureau of the Census, U. S. Dept. of Commerce. Names, correct titles and addresses of persons occupying administrative and supervisory positions in each executive and judicial department of the United States Government, including the District of Columbia, together with other pertinent information. 172 p. Pub. by Gov. Print. Off., Washington, D. C. 60 cents.

The Transportation Significance of the Steam Railroad, by L. F. Loree. President Loree's address before the Holland Society of New York. 13 p. Pub. by The Delaware & Hudson Co., New York City. Apply.

Periodical Articles

Meeting the Carloading Peak, by J. B. Hill. The President of the N. C. & St. L. Ry. explains the necessity for continuing to improve our railroad systems. Commerce, Finance & Industry, December 1926, p. 16-17, 42.

New Rail Route Now Spans the Andes, by Daniel del Rio. Non-technical description of the line and the scenery recently opened between Buenos Aires, Argentina, and LaPaz, Bolivia. New York Times Magazine, December 5, 1926, p. 9.

New Test Conditions in the Belgian State Railways' Specifications for Rails, by Jules Willem and Jules Servais. Describes rails, tests, etc. Bulletin of the International Railway Congress Association, November 1926, p. 931-993.

Note on the New French Railway Specifications for Steel Rails, by L. Cambournac. Why standard rails were adopted, principal requirements, etc. Bulletin of the International Railway Congress Association, November, 1926, p. 994-1006.

Great Northern Builds Longest Railway Tunnel in America

Thorough organization and well prepared plans to stimulate rivalry lead to new records of progress



A Mucking Machine and Crew Loading Material with Electric Locomotive in the Foreground

THE Great Northern is constructing a single track tunnel 7.78 miles long through the Cascade range between Berne and Scenic, Wash., which, when completed, will be the longest railway tunnel in America. The new line, of which it is a part, will lower the summit elevation 506 ft., will save 7.67 miles of distance and eliminate 6.04 miles of snow sheds, and 1941 deg. of central angle, besides reducing the maximum curvature from 10 deg. to 6 deg. Within the limits of the work the maximum gradient eastbound is reduced from 2.2 per cent to 1.565 per cent. As a part of the project the present electrification through the existing tunnel will be extended to Wenatchee on the east and to Skykomish on the west, a total distance of 80 miles, and, later 23 miles further west to Goldbar, 29 miles east of Everett.

From an economic standpoint the construction of the tunnel can be fully justified by the elimination of the snow sheds on the old line with their high maintenance cost and constant fire risk. The snowfall in the Cascades is very heavy and at the point where the railroad crosses the mountains, amounts to 56 ft. annually, which packs down to about 16 ft. on the level. As a result of this extraordinary volume of snow, combined with the steep slopes of the mountains, snow slides are frequent and troublesome. Occasionally, they destroy sections of the snow sheds and interrupt traffic until the track can be cleared of the snow and debris. In addition to the elimination of the snow sheds, the railroad will receive the benefits of the decreased rise and fall, the shorter distance, the better alinement and the improved traction resulting from the electrification of the mountain territory, and these taken together are in themselves sufficient to justify the project.

The outstanding feature of the construction is the rapid progress that has been made to date, as the world's record for advancing has been broken in four consecu-

tive months, in three of which the advance was greater than in the preceding month. As a result, on November 27 the contractor was ahead of schedule by the amounts shown later. In August the pioneer tunnel at Scenic, 8 ft. by 9 ft. in section, was carried forward 937 ft.; in September the 10-ft. by 10-ft. center heading at Berne was driven 954 ft., but counting October 1, as all records of tunnel advances are based on 31 days, this was increased to 984 ft.; and in October, a still higher record of 1,157 ft. was made in the pioneer heading at Scenic. In November an advance of 952 ft. was made in the pioneer tunnel at Scenic and 938 ft. in the center heading at Berne, and while lower than the September and October records in this tunnel both are greater than any known record on other tunnel work. On December 1, the total primary penetration was 17,257 ft. or 42½ per cent of the total length of the tunnel.

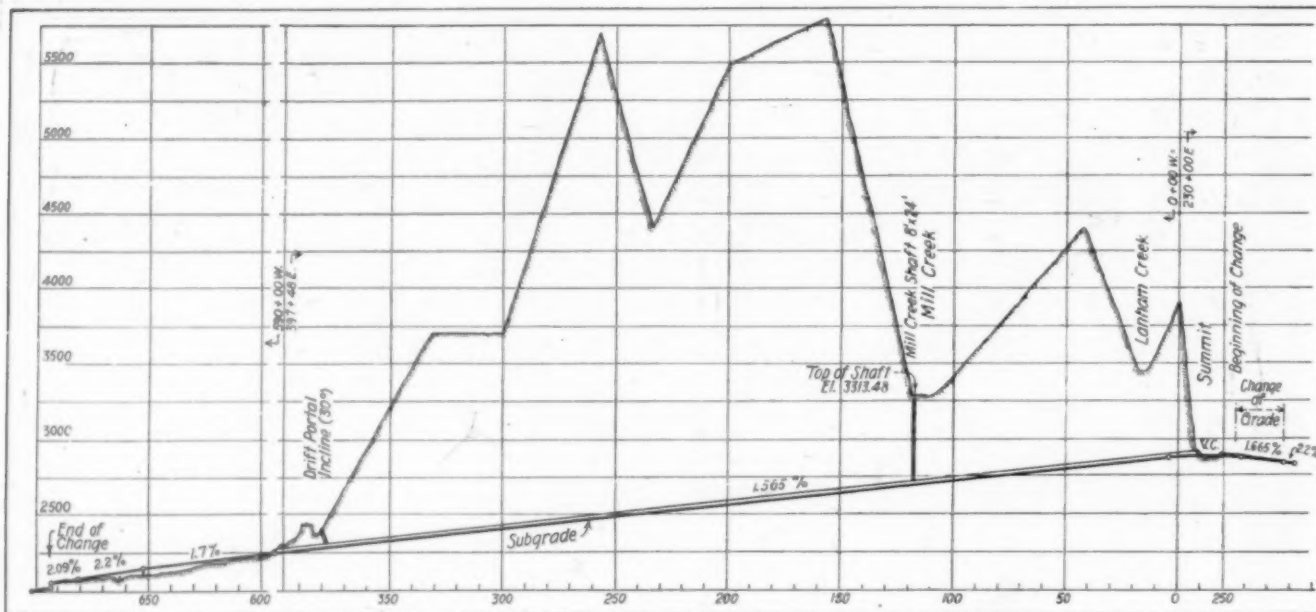
Recently the Great Northern has been rearranging its engine districts and gradually increasing the distance between engine terminals. As a result of this policy, the rearrangement between Spokane and Everett eliminated one district, so that freight trains now run from Spokane to Wenatchee, 174 miles, and from Wenatchee to Everett, 132 miles. The electrification, which is a part of the tunnel project, will extend over the heaviest of the mountain grades, and the later extension to Goldbar will cover practically the entire mountain territory through the Cascade range. When electrified service begins, it is expected there will be a material reduction in the time required to move trains between Skykomish and Wenatchee.

At present, the existing line passes through a tunnel 2.63 miles long and it is electrified to reduce the trouble experienced from locomotive gases. Under the present system of steam operation heavy pusher service is required. The speed is slow and much time is lost in switching the pushers in and out of trains, while stops

must also be made at Tye and Cascade, the portals of the existing tunnel, to attach and cut off the electric locomotives which pull the trains through the tunnel.

Under electric operation over the extended mileage, which will cover all of the heavy mountain grades, with the reduced grades and distance and the higher speeds of

Chiwaukum it lies in Tumwater canyon, entering Nason Creek canyon at the latter point which canyon it follows to its upper end at Cascade, the east portal of the tunnel. The line emerges from the tunnel at Tye and enters the canyon of the Tye river which it follows to Skykomish, 21 miles. Between Tye and Scenic, 9 miles,



A Profile of the Tunnel Showing the Location of the Mill Creek Shaft and the Tye River

the trains while in motion, the movement of freight through the mountains will consume less time. Again, with the improved traction the number of trains will be less; operating costs should be reduced materially; and a substantial amount of power and car equipment will

the line descends 1,045 ft., and about two-thirds of the distance is through snow sheds. At Martins Creek, the line passes through a tunnel, both portals of which face east. When the new tunnel is put in operation, the existing tunnel 2.63 miles long, between Cascade and Tye

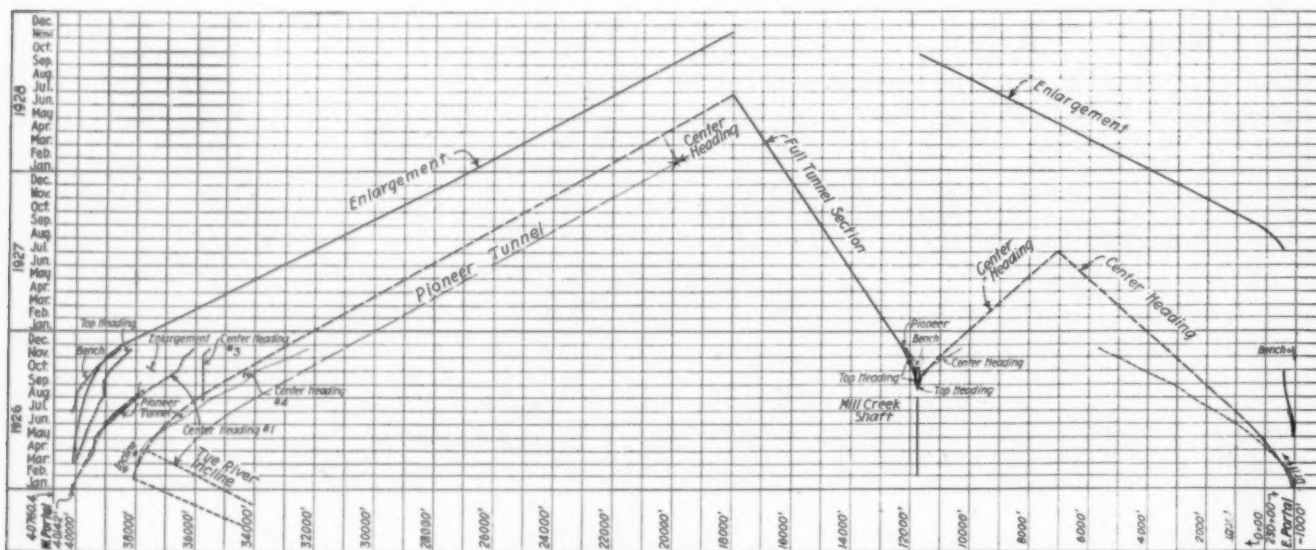


Chart of Proposed and Actual Progress

be released for other service. A detailed description of the electrification and the electric locomotives appeared in the *Railway Age* of November 27.

The Old Line

Westbound from Wenatchee, the line ascends the valley of the Wenatchee river and from Leavenworth to

and all of the old line between Scenic and Berne about two miles below Cascade, a total distance of 17.67 miles, will be abandoned.

It was stated at the beginning of this article that the new Cascade tunnel will be the longest one in America; it will also be the fifth longest in the world. A comparison with some of the longer tunnels of the world follows:

Name	Location	Length feet	Width feet	Height feet	Built
Simplon I	Switzerland	65,734	16.4	18	1895-1906
Simplon II	Switzerland	65,734	16.4	18	1921
St. Gothard	Switzerland	49,212	26.2	24.6	1872-1882
Loetschberg	Switzerland	47,685	30	20	1906-1913
New Cascade	Washington	41,142	16	24	1925-
Moffatt	Colorado	32,160	16	24	1923-
Rogers Pass	British Columbia	25,900	26.5	21.75	1913-1915
Hoosac	Massachusetts	23,175	25	20	1854-1876

How the Work Is Organized

Between Scenic and Mill Creek a pioneer tunnel, 8 ft. by 9 ft. in section, is being driven parallel to and 66 ft.



The Head Frame at the Mill Creek Tunnel Ready to Move into Permanent Position

south of the main tunnel, with cross cuts at intervals of about 1,500 ft. From these cross cuts a center heading, 10 ft. by 10 ft., is advanced on the line of the main tunnel, and this is being followed by enlargement to full

of the shaft. From Mill Creek a pioneer tunnel is being driven west, with cross cuts at intervals of 1,500 ft., to meet the pioneer advancing from the west portal, while a full tunnel section is also being driven west from the shaft. A center heading is being driven east from the foot of the shaft, for since the center headings between Mill Creek and Berne can be holed through in a comparatively short time, there is no advantage in driving a pioneer tunnel between these points. When the center headings from Berne and Mill Creek meet, enlargement will take place from the east portal.

It was desired to begin work on the center heading at Berne before a steam shovel was available to make the approach cut, and, as the topography was favorable, an adit was drifted in from the north until it met the line of the main tunnel about 200 ft. west of the portal, and from this point a center heading was started. After the approach cut was completed a top heading was drifted on the line of the main tunnel and the bench removed as far as the junction with the adit, but no further work will be done towards the enlargement at this end until the center heading from Berne meets the center heading which is being advanced east from Mill Creek.

At the Scenic end, the first 800 ft. was driven through soft material, consisting of clay in which large boulders were embedded and gravel streaks. This material was very wet, although the amount of water draining into the tunnel is comparatively small. At one point the bores crossed a seam of clay and gravel about 140 ft. wide, which had the consistency of sloppy concrete, and gave considerable trouble both at the face and in the placing of the timbers. Because the general character of the ground was known, it was deemed advisable to start the center heading in the rock west of the first cross cut, and the top center heading method was followed from the portal to this cross cut. The section was then enlarged to a full top heading and behind this the bench was removed to give the full 18 ft. by 26 ft. tunnel section.



Much Attention Has Been Given to Camp Construction and Sanitation

tunnel section from the west portal and from the foot of the Mill Creek shaft.

Mill creek flows through a deep and well defined canyon about 2.4 miles west of Berne, and here a point was selected to sink a shaft 659 ft. deep, so that additional faces can be worked both east and west from the foot

At the west end the tunnel emerges into the valley of the Tye river, which follows a tortuous course at this point and falls sharply in a series of cascades, so that, while the stream is below the track level at the portal, it crosses the tunnel about 60 ft. overhead at a point 2,000 ft. farther east. About 225 ft. east of the portal, a creek

tributary to the Tye crosses 14 ft. over the main tunnel and to avoid danger from flooding, a wooden flume was constructed to carry the water over both the main and pioneer tunnels.

Under the present channel of the Tye river a large crack was encountered which gave every evidence of being the result of an ancient slip. The rock seams were displaced both vertically and horizontally and the gap was filled with debris, consisting of clay, boulders, and logs, such as might be expected in a slide. Presumably the Tye river changed its course when the slip occurred, as the clay pocket already mentioned appears to be in the ancient bed of a stream, because it contained boulders, tree trunks, and other drift.

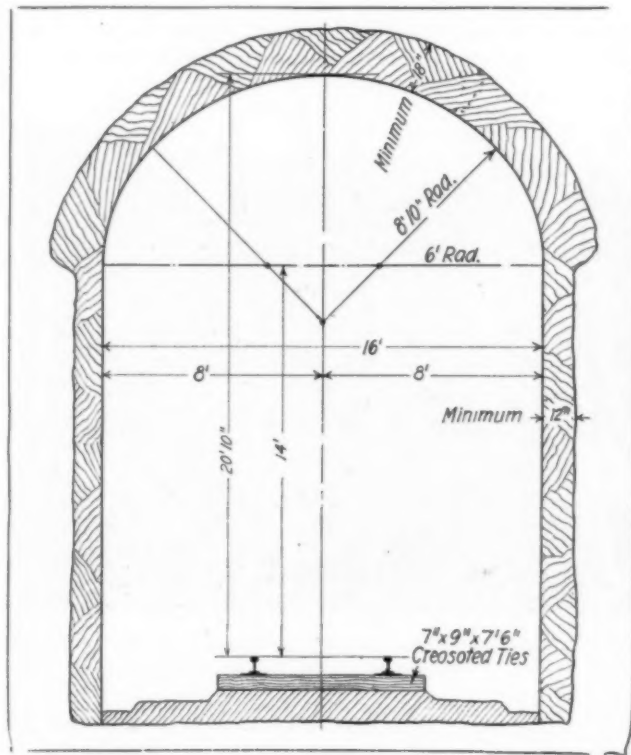
The amount of timbering and other safety precautions necessary while passing through the soft ground made it certain that progress would be very slow until the headings reached solid rock. For this reason, an incline was drifted down from a point immediately east of the Tye river to the line of the pioneer tunnel, which was advanced from the foot of the incline 3,387 ft., while an advance of 2,316 ft. was made from the portal. By this means the entire pioneer tunnel progressed 5,703 ft. by the time the soft ground was passed, and four working faces for the center heading of the main tunnel were available through cross cuts.

The center headings at Scenic were started at the first and second cross cuts, and as soon as the heading between the first and second cross cuts was drifted through, a top heading was started east from the first cross cut. It had been intended, if possible, to enlarge the section from cross cut No. 1 by the ring method, but the coarse granite encountered in this section is highly impregnated with lime, which slacks after a few days' exposure to the air and the rock spalls badly, so that the ring method was not considered safe. The top heading permits the roof to be timbered before the benches are removed, so the men can work with safety. East of cross cut No. 2, the rock structure so far encountered will permit ring shooting, although there are occasional narrow seams where timbering will be necessary.

Character of Rock

The first rock encountered was a coarse granite which is very hard, but, as mentioned, is impregnated with

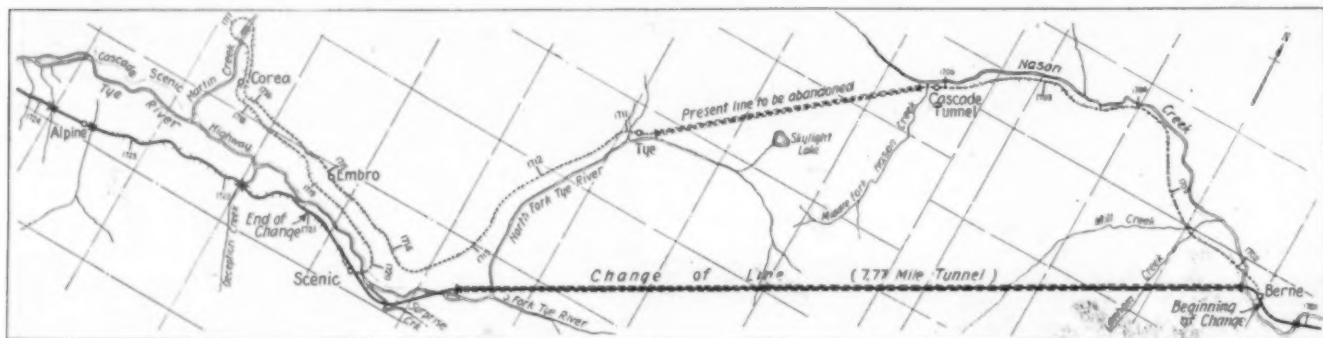
hampered blasting, so that several times it has been necessary to drill relief holes before the main holes could be charged for blasting. At one place the pressure was so great that the water jetted six feet from the holes. Peculiarly enough, however, the quantity of water has been comparatively small, and water under pressure does not occur in the center heading of the



The Standard Tunnel Section

main tunnel, apparently, because the pioneer tunnel, which is in advance, affords the necessary relief to the pressure.

At the Berne end the first rock encountered was a coarse granite, similar to that at Scenic, which was hard to drill and broke large enough to hamper mucking.



Map of the Present and New Locations Between Berne and Scenic

lime and slacks upon exposure. It was difficult to drill and broke quite large, so that mucking operations were slow. After passing cross cut No. 2 the rock is an altered granite showing a much finer grain with occasional streaks of schistose structure, and, except for an occasional pocket containing mica, it drills easily and breaks in a satisfactory manner. At intervals, water under pressure has been encountered in the pioneer tunnel at Scenic and this, while small in quantity, has

Timbering was required here also because of the tendency to slack. About 1,000 ft. from the portal a finer granite, similar to that beyond the second cross cut at Scenic, was encountered, and only a small amount of timbering has been required in this formation. This rock is very dry and water has given no trouble at the Berne end.

The foot of the Mill Creek shaft penetrated a large block of graphite, and the graphite was quite widely dis-

persed in the rock surrounding the main deposit, so that solid timbering was necessary in the enlarged chamber at the foot of the shaft. The full tunnel section, 18 ft. by 26 ft., was taken out for a distance of 100 ft., in both directions from the shaft to give working room for the disposal of the muck, and the full section will be continued west to permit the pioneer to advance more rapidly and make additional faces available, but the center heading is continued east from the enlarged disposal station.

Disposal pockets were constructed below grade and gates installed for the purpose of loading the hoisting buckets. The muck is loaded in cars of 50 cu. ft., capacity at the face of the center heading to the east, and in 6 yd. cars at the face of the enlargement to the west. It is then hauled to the foot of the shaft by electric locomotives and dumped into the pockets. These pockets discharge into hoisting buckets to be lifted to the surface, where the material is emptied into storage

the five long braces at the rear is a single timber in the form of a truncated square pyramid, 84 ft. long, and having end dimensions of 14 in. by 14 in. and 18 in. by 18 in., while the vertical members range from 12 in. by 12 in. to 16 in. by 16 in.

The method of driving the full tunnel section in both directions from the foot of the shaft was to advance a top heading and follow this with the removal of the bench. Before there was room to operate a mucking machine and the model 20 Marion shovel, a small Hoe scraper with a tugger hoist was used to slush the muck into the pockets. As soon as there was sufficient room for the shaft disposal station, the center heading was started east and is progressing rapidly. West of the shaft the full tunnel section is being advanced by means of a top heading and removal of the bench. About October 20, work was started on the pioneer tunnel and this will be carried forward as rapidly as possible. The pioneer tunnel will advance more rapidly than the main



The Portals of the Main Tunnel (left) and the Pioneer Tunnel (right) at the West or Scenic End

bins from which it runs into the cars to be taken to the dump.

To permit an early start in sinking the Mill Creek shaft and avoid the delay which would have resulted from the construction of a permanent head frame, a small temporary head frame was erected so that the sinking operation could be carried on while the permanent head frame was under construction. This was built in two sections, the pockets being built in the position they were to occupy, and the head frame proper about 15 ft. back of its final position to clear the temporary structure. When finished, the head frame was lubricated on its skids by forcing hard grease over the skids and onto the sills through pipes to which compressed air under 100 lb. pressure was applied. The head frame was then skidded forward by means of five 15-ton jacks, placed in exact position, and the shaft timbering was prepared with guides to match the guides fitted in the head frame. The time required to remove the temporary structure and place the permanent head frame was nine hours. The head frame is 80 ft. high and is substantially built of heavy timbers. Each of

tunnel, so that a center heading can be started at the second cross cut west of the shaft and the enlargement in that direction carried on continuously.

Tunnel is Comparatively Dry

As has been mentioned, water has given comparatively little trouble to date. The maximum amounts which have been encountered are as follows:

	Gallons per min.
Scenic pioneer	125
Scenic incline	215
Scenic main tunnel....	10
Mill Creek shaft.....	185
Berne center heading.....	2

Between June 1 and November 1, the quantity of water at Mill Creek decreased from the maximum to 95 gal. per minute, most of which comes from strata near the surface and not from the tunnel itself, as there is practically no seepage in the tunnel at this point. Except for the few instances mentioned, where water under pressure was encountered, the working face is dry and seepage does not begin for some time after the rounds are fired. At the west end the water drains by

gravity, but as the Tye river incline was situated at a point where the cover was 97 ft., the water in the incline heading, before the pioneer tunnel was holed through, was drained by gravity to a sump at the foot of the incline and discharged by electrically operated Cameron pumps.

Air and Electric Power Are Used

All of the mechanical operations in the tunnel are carried on by electric power, except the drilling and the operation of the shovels engaged in enlarging to full tunnel section which are done by air. The permanent trolley for the electric locomotives ends about 800 ft. from the working face to prevent its being torn down by the force of the blasts from the shots. As the locomotive must work near the face, it is equipped with a special hook to fit over the trolley near the end, and the power is transmitted through a heavily insulated and very flexible wire which winds off a reel on the engine. As the wire winds off it puts tension in a spring and when the locomotive returns the spring automatically winds the wire on the reel. The power for the mucker and hoist is brought up also by extension wires to avoid damage to the permanent lines from the blast.

The drilling is done by means of air machines and water core drills. The drilling machines are mounted on the cross bars of a Denver Rock Drill Company's movable carriage which runs between the haulage tracks. As soon as the mucking operation is completed, the mucking machine is withdrawn, the track is laid to the face of the heading, and the drill carriage is shoved into place. Four or six drills are used simultaneously, depending on the size of the working face. Where the rock breaks easily, 10 and 12 ft. rounds are pulled, but where the rock is seamy or inclined to break large, shallower holes or a larger number are drilled. The time required to drill a round varies with the character of the rock, and in some instances has required as much as six hours.

The track centers of the haulage tracks are such that the distance between the inside rails is equal to the gage of the tracks, so that the mucking machine and drill carriage run on what is to all intents and purposes a middle track and, therefore, are centered where brought up to the face of the heading.

By reference to the illustration it will be noted that the rear end of the drill carriage is equipped with manifolds to distribute the water and air to the several drilling machines so that only single lines of air and water need be connected when the carriage is placed for drilling. When it is spotted, it is anchored in place by means of a spud which depends from the forward end almost directly under the cross bar frame.

The mucking operations are carried on mechanically by means of Meyers-Whaley muckers in the headings, and steam shovels at the enlargement. Where the rock breaks in good shape, a 10 to 12 ft. round can be mucked out in about $2\frac{1}{2}$ hr., while where the rock breaks large more time is required. Cars of 50 cu. ft. capacity are used to transport the muck, and 12 of these cars are hauled at one time by General Electric tunnel locomotives. Only one car can be placed back of the mucking machine at a time and to avoid the delay of making a switch every time a car is loaded, a double track is laid to the face of the heading and the empties are set on one track, while the locomotive which is to dispose of the loads works on the other. A transfer hoist at the rear of the empty train lifts the cars over to the loading truck and the locomotive merely shoves them back to the discharge of the mucker. This system reduces the time of mucking by about one-third and muck-

ing is often completed by the time the drillers have finished scaling.

At the west end where the enlargement has progressed beyond the first cross cut the material is being loaded on six-yard cars by a model 40 Marion shovel mounted on a caterpillar tractor, and the cars are handled to the dumping trestle by 20-ton General Electric locomotives. At Mill Creek a model-20 Marion shovel is being used in the full tunnel section west of the shaft. Electric locomotives and six-yard cars are in service at this face also.

A typical cycle of the heading operation at the Tye



Timbered Section of Pioneer Tunnel

river incline, when the heading had been drifted 3,054 ft. from the foot of the incline, is interesting:

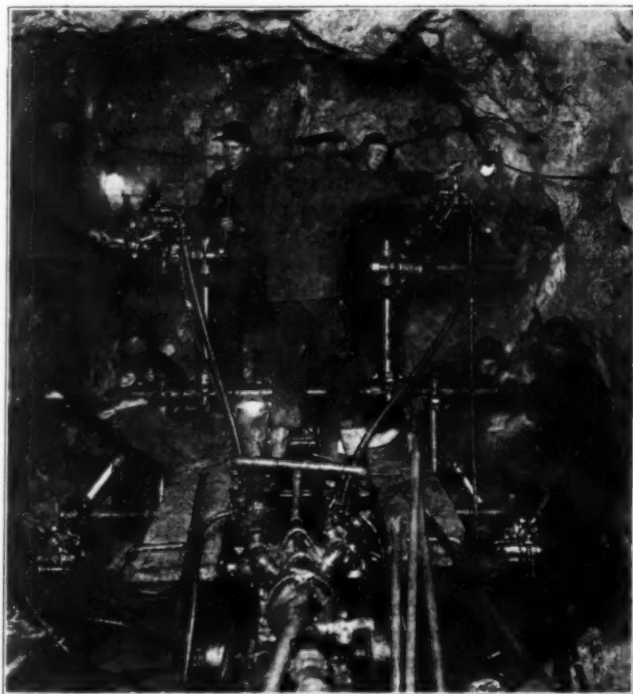
Blast	7:10 a. m.
Time required for ventilation	27 min.
Time to enter drift, and clean up fly rock with mucking machine, and hand mucking	38 min.
Main muck pile	1 hr. 22 min.
Remove mucker and set drill carriage	38 min.
Drilling 28 holes 8 ft. 6 in.	1 hr. 17 min.
Loading and retiring	18 min.
Blast	11:50 a. m.
Total time of one complete cycle	4 hr. 40 min.
Used 195 lb. 60 per cent gelatin	
Advanced 7 ft. 6 in.	
Cross section 9 ft. by 10 ft.	
Four drills on Denver Rock drill carriage	
Character of rock—altered granite	
Number of men, 16—including shifter and foreman of underground labor gang	
Twenty-eight 50 cu. ft. Koppel cars loaded and dumped on waste pile at head of incline.	

Bonus Paid for Rapid Progress

The high rate of progress has been mentioned. So far as known, the greatest monthly advance heretofore recorded was in the west pioneer of the Connaught tunnel at Rogers Pass on the Canadian Pacific in January, 1915. While this advance was 932 ft., it was made on a face 8 ft. by $6\frac{1}{2}$ ft., or 52 sq. ft., whereas the high record of 1,157 ft. at the Cascade tunnel was made on a heading 8 ft. by 9 ft., having an area of 72 sq. ft., so that the amount of rock broken and removed was 38.5 per cent greater per running foot.

The heading operation is paid for on a footage basis with a bonus for progress in excess of a stipulated number of feet. Crews working directly in the heading are paid at different rates per foot of progress for the several

services which they perform, but with the understanding that their pay will not be less than it would have been under the hourly rate which was in effect prior to July 1. The footage price was established by using 650 ft. as the basic progress for a month, and the established monthly pay on the hourly rate for a full month's work as the standard minimum. On this basis the bonus is derived by multiplying the number of feet advanced in excess of 650 ft. by the footage rate. The second month this ruling was in effect the crews in the Scenic pioneer tunnel broke the world's record for advancing and



The Drill Carriage at the Pioneer Tunnel Heading

greater progress was recorded in both September and October. All men directly engaged in the heading operation or working at the face come under the application of the bonus system, but the bonus rate is different for the different services and, as has been explained, depends on the hourly rates of pay in effect prior to July 1. The several grades of employees that participate in the bonus are drillers and helpers, nippers, underground laborers and foremen, handy men, hoist operators, mucker or shovel operators, brakemen, motormen and shifters, an average of 66 men in three crews at every face.

In addition to the bonus, a "high camp" pennant was designed and is given to the camp having the best record for the previous month. There is a friendly but none the less intense rivalry for the pennant, which has changed hands several times. The device on the pennant, the Great Northern "goat," is pertinent and is the cause of good natured gibes between camp adherents.

The following incident is indicative of the rivalry for the pennant, existing between camps. The footage basis of payment went into effect at 7:45 a.m., July 1. The shift going off duty at this hour in the Tye river incline had a round drilled and loaded at 7:40. The progress had been so nearly equal that they had the choice of shooting before 7:45 and taking the pennant away from Berne, or holding the shot until after 7:45 and having the footage apply on the July bonus. They did not hesitate, but pulled the round and sacrificed the bonus for the pennant.

All gangs work eight hours, and those not engaged in the mining operations are paid either an hourly or a monthly rate. Men are not worked overtime unless absolutely necessary, but when they are required to do so, penalty overtime is not paid. All operations are carried on continuously three shifts a day, and seven days a week.

Source of Electric Power

In a tunneling operation of such magnitude only air or electric power can be used to operate the mining machines and haulage equipment. When the work was started, no current was available at either portal although arrangements were made to bring power lines to these points as soon as weather and snow conditions permitted. At the west portal it was not possible, however, to complete the power line earlier than about the middle of the summer of 1926, and to avoid delay a generating station was established at Scenic. Two six-cylinder 360-hp. and one two-cylinder 120-hp. Fairbanks, Morse & Co., Diesel engines were installed to drive the generating equipment; delivery of power from this plant began March 18 and continued to August 6, when the Great Northern power line from Everett, 97 miles, was completed. A maximum of 14,300-kw. hours a day is used at the west portal in the mining and hauling operation, the compressor room, and the repair shop.

Electric traction is employed in the existing tunnel and the Great Northern constructed a power line from



Looking Towards the West Portal at Scenic, Wash.

Cascade, the east portal, to a frequency changing station at Lanham Creek spur, from which the power was distributed to Berne and Mill Creek. This line and station were completed April 17 and power is still being delivered at a maximum rate of about 10,000-kw. hours a day.

All drilling machines are air operated and complete compressor plants with electrically driven Sullivan angle compound compressors have been established at all three camps. The plant at Scenic contains five compressors of 950 cu. ft. capacity each, which compress the air to

110 lb., but at the other camps the number of working faces is not so great and a smaller compressor capacity is employed, although space is provided for additional equipment when needed. The air for ventilation is supplied by electrically driven fans, and is conducted to the point of delivery through sheet metal pipes of the required size.

Storehouses and completely equipped repair shops, with machine tools, forges, and other equipment, are established at each camp, and a force of skilled mechanics is employed so that repairs can be made to practically every piece of equipment in use. A section of the shop is set aside especially for grinding and tempering drills.

Much Care Given to Camp Construction

The camp buildings are substantially constructed and every effort has been made to give the men clean, sanitary and comfortable quarters. Bunk houses accommodate 10 men, and well equipped bath houses with showers and laundry facilities are placed at intervals in the camps to avoid crowding. Sanitary toilets and sewage disposal have been provided. Every camp has a commissary, a lounging room, and a recreation building where lectures, moving pictures or other entertainment may be given and dances held. Separate houses have been constructed for the men who have families and a monthly allowance is given those who board themselves. The dining rooms are spacious; the kitchens are exceptionally well equipped and have bakeries of ample capacity to bake all the bread and pastry used. Special houses have been built for the engineering staff and the contractor's supervisory forces.

The new alignment required the purchase of a summer resort hotel at Scenic and this has been partly remodeled to provide offices for the contractor and the engineering forces. The accommodations are sufficient to house about 50 employees and such visitors as have business with the railroad or contractor.

All three camps are in the mountains far from school accommodations and to provide instruction for the children in the camp, schoolhouses with sanitary toilets and heating plants have been erected to care for 50 children at Scenic and 35 each at Berne and Mill Creek. The local school authorities provide the teaching force.

Line Changes

The east portal is below the elevation of the present track at Berne so that a minor line change and grade reduction was required to reach the tunnel. The present alignment in this section is very crooked and, as a large amount of material which otherwise would have to be wasted is available for embankments, a revision of the line from Berne to Merritt, $9\frac{1}{2}$ miles, is being made to reduce the heavy curvature and eliminate a number of snow sheds. The only improvement in the grade, however, is that brought about by the slightly lower elevation of the portal.

At Scenic, it was necessary to construct about two miles of new line to connect the tunnel with the present track. Descending to the west, the gradient is 1.7 per cent compensated for the first mile west of the tunnel to provide for yard tracks. The new line crosses the existing line twice, once immediately east of Scenic station, where it is 32 ft. higher than the old line, and again near the junction of the two lines one mile farther west where the difference in elevation is 5 ft. To facilitate dumping the material from the tunnel, which is used to construct the embankment, a temporary pile trestle has been driven from the tunnel to the junction of the two lines. Directional passing sidings for east and west-bound trains will be constructed at both ends.

Chronology and Progress

The work of clearing the sites for the camps began on December 1, 1925. The approach cut for the west pioneer tunnel was commenced on December 14 and on December 29 the adit or side drift, to reach the center heading at Berne, was started. The drift for the Tye River incline was begun on January 23, 1926, and the sinking of the Mill Creek shaft was started on January 30. On November 27, 1926, the advance faces in the drifts had made the following penetrations:

	Feet
West pioneer (including Tye River incline), Scenic.....	8,140
Center heading, Scenic (eastward).....	3,498
Center heading, Berne (westward).....	6,688
Center heading eastward from Mill Creek shaft.....	1,512
Pioneer west from Mill Creek shaft.....	597
Full tunnel, Scenic (eastward).....	1,742
Full tunnel west from Mill creek.....	447

The contract stipulates that the entire work shall be completed not later than October 30, 1928, and on March 1, 1926, after the preliminary work was finished, a progress chart delineating the progress which must be made to accomplish this was prepared jointly by the railroad and contractor. On November 27, the several operations were ahead or behind the schedule as follows:

	Feet Ahead	Weeks Behind	Feet Behind
West pioneer (including Tye river incline) Scenic..	860	4 1/2	
Center heading, Scenic	328	2	
Center heading, Berne	2,200	19	
Center heading, east from Mill Creek shaft.....	425	3 1/2	
Pioneer, west from Mill Creek shaft.....	37	2 1/2	
Full tunnel, Scenic.....	75	1 1/2	
Full tunnel, west from Mill Creek shaft.....			90

Supervision

A. Guthrie & Co., Inc., of St. Paul, have the contract for the tunnel work and line changes; J. C. Baxter, vice-president, has general charge for the contractor; while R. F. Hoffmark, general superintendent, has direct charge of the entire operation. W. E. Conroy is assistant general superintendent and H. J. King, F. J. Kane and C. G. Jones are camp superintendents at Scenic, Berne and Mill Creek, respectively.

The project is being carried on under the general direction of J. R. W. Davis, chief engineer of the Great Northern. Colonel Frederick Mears, assistant chief engineer, has direct charge for the railroad, and M. J. C. Andrews is resident engineer.



Photo C. P. Cushing

A Rail Ford in Mail and Express Service on the Salem, Winona & Southern in the Ozarks

Executive Changes in Van Sweringen System

F. D. Underwood, president of Erie to retire—J. J. Bernet now Erie executive and W. L. Ross heads Nickel Plate

FREDERICK D. UNDERWOOD, president of the Erie, will retire on December 31. He will be succeeded by John J. Bernet, now president of the New York, Chicago & St. Louis. W. L. Ross, senior vice-president of the Nickel Plate, will take Mr. Bernet's place as the president of the latter property. Mr. Underwood retires from the presidency of the Erie after 25 years' service in that capacity which followed an extensive career on other railroads. The fact that he will be succeeded by the Nickel Plate executive may be expected to set at rest recurring rumors that the Van Sweringens were proposing to drop the Erie from their plans for the greater Nickel Plate system.

Mr. Underwood is unquestionably one of the most picturesque of the country's railway executives. On the whole, it may properly be said that he represents the last of a preceding generation of railroad leaders. He came to the Erie in 1901 with considerable reputation as a railroad builder and throughout his entire career he has been noted for his striking individuality and forceful personality. Most executive heads of large corporations are examples of what the psychologists designate as the motive type. Mr. Underwood is particularly to be so characterized. Any railroad executive is successful according to his ability to pick and develop men. Mr. Underwood has shown particular aptitude in this respect and on occasion he has shown peculiar skill in picking men for their ability to do the work in hand rather than because they may have specialized in that work previously. It has been said that there is probably no railway executive who has given more railroad men the opportunity to develop to higher positions than has Mr. Underwood. In similar vein, one of Mr. Underwood's great assets has been his ability to get things done in spite of adverse circumstances, and as president of the Erie he has been confronted until more recent years, with many such adverse circumstances. Withal, it is said that he has always succeeded in getting fun out of his job and in having a good time at it.

Mr. Underwood has had a rather varied railroad career. He started in railroad service as a brakeman with the

Chicago, Milwaukee & St. Paul, serving later as a checker at a grain elevator scales. He then served as a yard master, for a while as a baggageman, and then as a conductor. He was good enough as a conductor so that he was assigned at one time to the task of making special runs on trains that had been reported as unable to follow their schedules, for the purpose of instructing the crews in improved methods of getting over the road. He next appeared as superintendent of the St. Paul's grain elevator at La Crosse, Wis.,

said that he made good at this job because of his ability with his fists and other persuasive qualities whereby he induced the boat captains and crews to do things as the railroad, represented by Mr. Underwood, preferred. He was later promoted to assistant division superintendent and superintendent.

A Railroad Builder

In 1886, he entered the service of the Minneapolis & Pacific, now the Minneapolis, St. Paul & Sault Ste. Marie. This property had been taken over by the Canadian Pacific and Sir William Van Horne, head of the latter, had ambitious plans for the expansion of its United States property. Mr. Underwood entered the employ of the road as general superintendent of construction, was later promoted to general manager and then to vice-

president. During his connection with the property it was expanded into a great grain carrying road and a feeder for the parent Canadian Pacific. It is not generally known that because of the activity in this period Mr. Underwood holds the record of having built more miles of railroad in Minnesota than any other one man. It was during this period also that he gave some indication of his ability to pick men. One of these was Edmund Pennington, who succeeded Mr. Underwood when he left the Soo Line and was later its president and chairman of the board of directors. Another was Daniel Willard, now president of the Baltimore & Ohio. Mr. Willard, as an engineman, was on the recommendation of his roundhouse foreman, promoted to traveling engineer, then to roundhouse foreman, trainmaster and superintendent. When, in 1899, Mr. Underwood left the Soo Line to become general manager of the Baltimore



F. D. Underwood

& Ohio, Mr. Willard went with him as assistant general manager.

Mr. Underwood was with the Baltimore & Ohio for about two years, first as general manager and then as second vice-president. He was elected president of the Erie in 1901.

Erie Improvement

The Erie at that time had been out of receivership six years. The 1895 reorganization had not eliminated the heavy burden of fixed charges for which the Erie had always been noted. Furthermore, it has generally been considered an error of judgment that dividends should have been paid on the first preferred stock from 1901 to 1907. In 1901, the Erie acquired control of the Pennsylvania Coal Company. This step was severely criticized at the time as an extravagance but it is generally admitted today that good judgment was shown, because the Erie's coal properties are now estimated to have a value of from 80 to 100 million dollars and they have paid in dividends considerably more than the interest on the money borrowed to provide funds for the purchase of the coal company securities.

The story of Mr. Underwood's long period with the Erie has been one of steady upbuilding of the property by plowing back such net income as has been available. When he became its president, the road was handicapped by adverse grades and other operating difficulties, while at the same time it had to meet the competition of several wealthy and efficient properties. It was barely saved from receivership in 1907. Mr. Underwood has, however, apparently accomplished the impossible. The property earned in 1925 \$3.71 a share on its common stock and in 1924 \$6.26 a share. Its earnings so far this year have been ahead of those of both years. The record of Mr. Underwood's administration is given in more detail as follows:

In the 24½ years from July 1, 1901, to December 31, 1925, the Erie had net income of \$121,461,728 of which \$11,097,942 was paid in dividends, \$17,368,849 applied to sinking fund and the remaining \$92,994,937 plowed back into the property for additions and improvements. The property investment account increased approximately \$174,200,000 during this period. Of this sum nearly \$93,000,000 was derived from earnings as contrasted with \$81,200,000 secured from the proceeds of the sale of securities and increased liabilities in the form of other indebtedness.

Physical Rehabilitation

During Mr. Underwood's administration \$44,500,000 has been spent for additional tracks and grade reduction. In the period from July 1, 1901, to December 31, 1925, track mileage increased from 2,868 miles to 3,759 miles, or 31 per cent. Between Meadville, Pa., and Port Jervis, N. Y., 428 miles, the ruling grade eastbound has been reduced from 0.65 per cent to 0.20 per cent, except for 17 miles between Falconer and Steamburg, and westbound to 0.30 per cent, except for 4 miles from Falconer towards Jamestown. Between Jersey City and Port Jervis, 87 miles, the ruling grade has been made 0.20 per cent eastbound and 0.60 per cent westbound.

Similar improvements have been made on the western lines, the Kent division between Kent, Ohio, and Marion, 113 miles, having been double-tracked and grades reduced. Between Marion, Ohio, and Hammond, Ind., a distance of 249 miles, the line has been double-tracked and the eastbound ruling grade reduced to 0.2 per cent between Marion, Ohio, and Huntington, Ind., and to 0.3 per cent between Huntington and Hammond, while the westbound ruling grade was reduced to 0.2 per cent for

the entire distance. These grades were originally 0.55 per cent in both directions. The line west of Marion is 95 per cent tangent and has no curves which restrict the speed of trains. The Erie at the present time has the second lowest grade route between Chicago and New York.

The average weight of rail in the main track between Jersey City and Chicago has been increased from 83 lb. to 97 lb. per lineal yard. New bridges to the number of 975 have been constructed on this main line, all of steel or concrete, at a cost of \$4,300,000. A total of 1,033 miles of automatic block signals has been installed at a cost of \$2,600,000. In addition, extensive terminal improvements have been made at New York, Jersey City, N. J., Weehawken, N. J., Hornell, N. Y., Cleveland, Ohio, Chicago and other points.

The total capital charge for equipment in this period totaled \$94,000,000 and made possible a 136 per cent increase in total tractive power of locomotives, 71 per cent in aggregate capacity of freight cars, 48 per cent increase in the number of passenger cars, and the acquisition of six ferryboats and other floating equipment.

So much for what Mr. Underwood has done by way of improving the physical condition of the Erie. The results of his efforts are also strikingly shown in traffic and operating statistics. Total operating revenues increased from \$40,700,000 in 1901 to \$118,543,000 in 1925. In the same period, freight revenues increased from \$30,191,000 to \$94,671,000 and the number of passengers carried increased from 18,597,000 in 1901 to 30,448,408 in 1925. The number of tons of freight carried increased from 27,700,000 to 50,400,000, or 82 per cent, while the number of tons of freight carried one mile increased from 4,756,339,949 to 11,363,376,567, or 139 per cent. The increase in freight train miles over the same period was only 3 per cent. Another evidence of increasing operating efficiency is the fact that the average tons of freight per train rose from 400 in 1901 to 950 in 1923, or 138 per cent.

An independent audit made in 1924 showed that the per cent of increase in revenue ton-miles of freight on the Erie in 1923, as compared with 1910, was 72.47, compared with increases of from 20.69 to 56.26 per cent on other lines in Erie territory. Over the same period fixed charges and rentals per 1,000 equated traffic miles (this figure being determined by adding to the actual ton-miles three times the passenger-miles), showed a decrease on the Erie of 15.67 per cent as compared with increases ranging from 32.63 per cent to 54.24 per cent on other roads in this territory. At 19 competitive points, the average increase in traffic was 247 per cent during Mr. Underwood's administration.

Bernet Becomes Erie President

The Van Sweringen brothers of Cleveland obtained their start in the steam railroad business in July, 1916, when they acquired the New York, Chicago & St. Louis from the New York Central. They did the wise thing of selecting as the man to manage their property John J. Bernet, at that time resident vice-president of the New York Central and also the Michigan Central at Chicago. Mr. Bernet had spent all his railroad career up to that time on the Lake Shore & Michigan Southern (absorbed into the New York Central on January 1, 1915) and had advanced in the familiar line of promotion from operator, through the positions of dispatcher, trainmaster, superintendent, etc.

The Nickel Plate's progress towards its present prosperity was delayed slightly by the advent of federal control but after the railroads were returned to their owners

it began to attract the attention of shippers by its expeditious service and skillful solicitation of business. Even though it was handicapped by having only a single track and lacked other facilities it soon succeeded in being able to offer, particularly in connection with the Lackawanna and Lehigh Valley, the most expeditious and regular fast freight service available between New York and Chicago, this meaning more than any thing else that under Mr. Bernet's guidance it was one of the first roads in this territory to restore its operating efficiency to pre-war standards of performance.

It is only fair, however, to add that its competitors in this territory have more recently been able to supply as good service—a fact which is notably true of the New York Central or of the Wabash. For a while the observers of railroad operating efficiency were interested in watching Nickel Plate figures of car miles per day, fuel

his railroad is giving the service that the shippers desire. Mr. Bernet is also the chairman of the transportation division of the American Railway Association.

J. J. Bernet, was born on February 9, 1868, at Brant, Erie County, N. Y., and was educated in the public schools at Buffalo, N. Y. He entered railway service in 1889 as a telegraph operator on the Lake Shore & Michigan Southern and on March 12, 1895, was promoted to train dispatcher. He held this position until April 2, 1901, when he was promoted to trainmaster on the Eastern division, and on March 6, 1903, he was again promoted to assistant superintendent of the same division. On February 1, 1905, he became superintendent of the Eastern division. He was promoted to assistant general superintendent at Cleveland, O., on November 22, 1905, and on October 1, 1906, to general superintendent.

On June 1, 1911, he left the Lake Shore to become



J. J. Bernet



W. L. Ross

consumption or the other data indicating operating efficiency. Increasing prosperity of the Nickel Plate soon enabled it to advance to even larger things. In March, 1922, it acquired the Toledo, St. Louis & Western, then in April, 1922, the Lake Erie & Eastern, and in August, 1924, it announced its ambitious plan for the acquisition of the Erie, the Pere Marquette, the Chesapeake & Ohio and the Hocking Valley and the establishment of the greater Nickel Plate System. The important fact from the standpoint of Mr. Bernet is the opinion held by many observers that the ambitious plans of the Van Sweringens were made possible by the prosperity secured for the original Nickel Plate through the operating skill of its president.

Mr. Bernet, however, is noted for other things than his operating skill. He is given considerable credit for being an unusually able traffic solicitor through the care he takes to keep in touch with shippers and to assure that

assistant to the vice-president of the New York Central Lines west of Buffalo, with headquarters at Chicago, and on April 15, 1912, his title was changed to assistant vice-president. On April 1, 1913, he became vice-president in charge of operation. At the time of the consolidation of the New York Central & Hudson River and the Lake Shore & Michigan Southern, into the New York Central on January 1, 1915, he was chosen resident vice-president at Chicago for the New York Central, acting as the general representative for the company in that territory. He also retained the vice-presidency in charge of the Michigan Central.

Mr. Bernet was elected president and general manager of the New York, Chicago & St. Louis on July 15, 1916, and from October 28, 1918, to March 1, 1920, he served as federal manager of the Nickel Plate. At the end of that period he again assumed the title of president and has continued in that position as the Nickel Plate has

been enlarged in size by the acquisition of the Toledo, St. Louis & Western and the Lake Erie & Western.

Ross Elected President of Nickel Plate

W. L. Ross, senior vice-president of the New York, Chicago & St. Louis, who has been elected president of the property to succeed Mr. Bernet came to the Nickel Plate when the latter acquired the Clover Leaf. Mr. Ross has had a rather varied railroad career. He has served as an office boy, operator, cashier, agent, general passenger agent, general freight agent, president and receiver. He began his railroad career on the Wabash. Later he worked under T. P. Shonts in the construction of the Three I's railroad, the Indiana, Illinois & Iowa. When this property was sold to the New York Central, he went with Mr. Shonts to the Toledo, St. Louis & Western. Beginning in 1904 with the title of general passenger agent, he was later also appointed general freight agent, and in 1907 was promoted to general traffic manager. It was at this time that the Clover Leaf acquired from the Rock Island the latter's majority control of the Chicago & Alton so Mr. Ross was also made general traffic manager of the latter. In 1909 he was elected vice-president in charge of traffic and in 1910 and 1911 served also in the same capacity for the Iowa Central and Minneapolis & St. Louis then also included in the so-called Hawley system. On September 1, 1912, he was elected president of the Toledo, St. Louis & Western.

The Clover Leaf's experience with its purchase of Alton stock was an unfortunate one. It received dividends on it in 1908-9, dividends at a lower rate in 1909-10, and at a still lower rate in 1910-11, but none thereafter. As a result it became unable to pay the interest on the collateral bonds in 1914 and defaulted payment at maturity in 1917. The result was receivership and litigation. Mr. Ross becoming receiver in October, 1914. Settlement of the litigation was finally effected out of court in December, 1921, under a scheme whereby the holders of the defaulted collateral bonds were given a combination of Alton preferred and common stocks, Clover Leaf preferred and common stock and cash. The Clover Leaf stock needed for this arrangement was obtained from the Clover Leaf stockholders. The settlement of this litigation seemed suddenly to bring to the light the fact that the Clover Leaf, although in receivership, was a rather prosperous property. When the reorganization was effected it was carried out without any foreclosure sale or readjustment or contribution of new capital. The receivership was terminated as of December 31, 1922. It was in March, 1922, that the Van Sweringens made their investment in the property.

The Clover Leaf came out of its receivership with increased investment in both road and equipment, the increase in the latter case over the investment in equipment at the beginning of the receivership being nearly one-half. It had had to pay out in litigation expenses and in connection with the settlement agreement some \$2,730,000 but it came out of receivership with \$3,132,000 more cash than it had at the beginning of the receivership at which time, naturally, it had practically none. At the same time, funded debt had been decreased from \$28,900,000 to only \$17,700,000, while corporate surplus had increased from \$2,766,000 to \$7,109,000. Gross income in 1914 totaled \$4,600,000 but in 1922 it totaled \$11,500,000.

The Clover Leaf had a line from Toledo to St. Louis and it connected with the Nickel Plate's line from Buffalo to Chicago at Continental, Ohio. It was much like the Nickel Plate in that each property had a single line without branches, each was mostly single track and each up to just prior to that time had been regarded as a line

of secondary importance in a highly competitive territory. By the time of the joining of interest this situation had already changed and at the moment the Nickel Plate was in the position of being able to offer about the best fast freight service available between the Niagara frontier and Chicago, and in connection with the Clover Leaf via Continental about the most expeditious and regular time freight service between the Niagara frontier and St. Louis. The two roads had such common interests and were so closely allied from a service standpoint that to bring them under one control seemed logical.

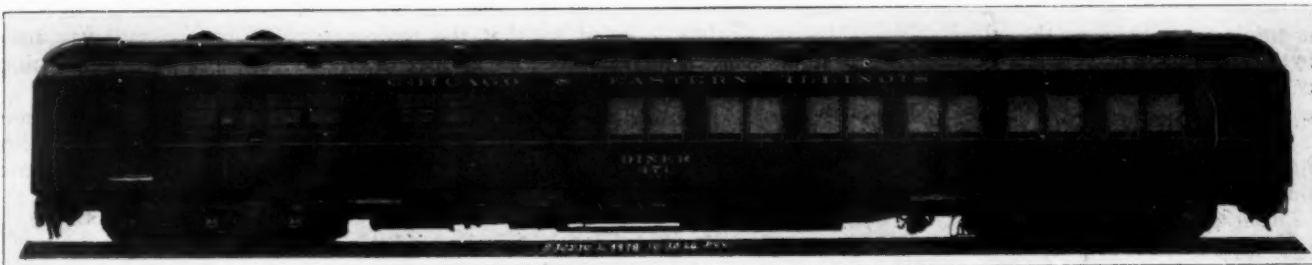
The actual merger of the Nickel Plate and Clover Leaf into a single corporation occurred under a plan dated December 28, 1922, approved by the Interstate Commerce Commission in June, 1923. Mr. Ross has continued to be in charge of the Clover Leaf district. He now bears the title of senior vice-president and he has continued to have his headquarters at Toledo, Ohio. The evidence is that Mr. Ross becomes the head of the Nickel Plate fortified with many years of valuable experience in the territory which it serves as a whole, then as the guiding hand for a long period of years of one of its constituent properties and finally as senior vice-president of the Nickel Plate itself. It is not without interest that he will take up his new duties as president upon his birthday, because on January 1, 1927, he becomes 62 years of age.

Walter L. Ross was born on January 1, 1865, at Bloomington, Ill., and was educated in the public schools of Bloomington. After having been a messenger boy, operator and clerk for the Western Union Telegraph Company, he entered railway service in 1887 as an office boy on the Wabash, after which he was consecutively operator, chief clerk and cashier in the local office, clerk in the trainmaster's and dispatcher's offices and local agent on the Wabash and the Indiana, Illinois & Iowa, general agent on the Indiana, Illinois & Iowa and division freight and passenger agent on the same road. On June 1, 1904, he became general passenger agent of the Toledo, St. Louis & Western and on April 1, 1905, also general freight agent. On December 1, 1907, he became general traffic manager of the Toledo, St. Louis & Western and the Chicago & Alton at Chicago and from 1909 to September 1, 1912, he was vice-president in charge of traffic. From 1910 to 1911 he was also vice-president of the Iowa Central and Minneapolis & St. Louis. On September 1, 1912, he became president of the Toledo, St. Louis & Western. He was receiver of the latter from October, 1914, to January 1, 1923, when it became a part of the New York, Chicago & St. Louis of which he is now senior vice-president with headquarters at Toledo, Ohio. Mr. Ross is also president of the Detroit & Toledo Shore Line and vice-president of the Toledo Terminal.



Left—Looking from C. N. R. La Gauchetière Station, Montreal, toward Mt. Royal Electrified Tunnel.

Right—Looking from Tunnel Entrance Toward Station



C. & E. I. All-Steel Diner Built by Pullman

New Dinners for the "Dixie Limited"

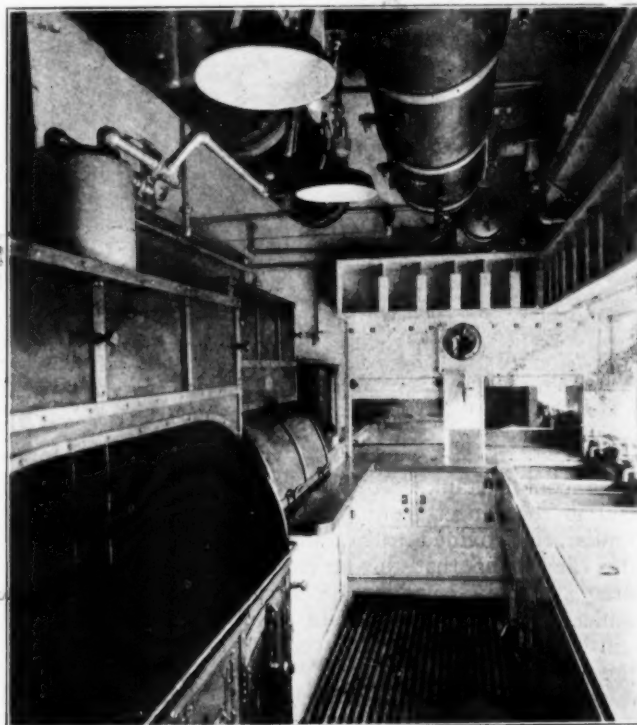
C. & E. I. installs two cars of all-steel construction with tables for 36 passengers

THE Chicago and Eastern Illinois has placed two new dining cars in service on the Dixie limited. These diners embody many of the latest improvements in steel car design and arrangement of service facilities. They were built by the Pullman Car & Manu-

facturing Company in accordance with specifications furnished by the railway. The overall length of these cars is 83 ft. 4 in., of which 38 ft. 10 in. is used as a dining room seating thirty-six persons.



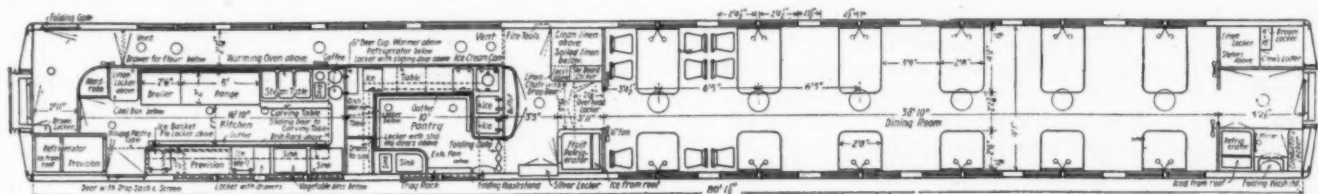
The Pantry, Facing the Kitchen



The Kitchen, Facing the Pantry

facturing Company in accordance with specifications furnished by the railway. The overall length of these cars is 83 ft. 4 in., of which 38 ft. 10 in. is used as a dining room seating thirty-six persons.

two-tone blue laid over a heavy ozite pad. The chairs and tables are of dark walnut of antique design, finished in leather upholstery. With the tables spaced 6 ft. 5 in. and the chairs designed with flat backs, there



Floor Plan of C. & E. I. Diner Showing Arrangement of Dining Room and Equipment

is ample space between the tables. The tables are slightly lower than usual as it has been found that the waiters can serve across a lower table with greater safety and ease than across one of the usual height.

Four sixteen-inch oscillating fans circulate the air in the dining room and positive ventilation is accomplished by concealed exhaust fans.

Rustless sheet metal is used in the construction of the kitchen compartments and live steam is piped to all sinks so that glass, silverware, and dishes may be sterilized with each cleaning. A hot water faucet is provided over the range so that it is not necessary for the cooks to turn around when hot water is needed for cooking. Drinking water is first filtered and then stored

vided so that the temperature of the passageway may be regulated altogether independently from the dining room.

The trucks are the Pullman top equalizer, six-wheel type with Commonwealth cast steel frames and Simplex clasp brakes. National coil spring journal boxes are used. All window sash and doors are pressed steel.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading for the week ended December 11 amounted to 998,715 cars; a decrease of 9,981 cars as compared with the corresponding week of last year but an increase of 41,291 cars as compared with 1924. Decreases were shown as compared with last year in all classes of commodities except coal, of which 237,735 cars were loaded, an increase of 45,785 cars, and in all districts except the Eastern, Allegheny and Pocahontas. As compared with the preceding week there was a decrease in the total loading of 59,436 cars, showing the usual seasonal decline. Loading of grain and grain products showed a decrease of 11,442 cars as compared with the corresponding week of last year, and miscellaneous loading a decrease of 24,903 cars. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

REVENUE FREIGHT CAR LOADING Week Ended Saturday, December 11, 1926

Districts	1926	1925	1924
Eastern	226,776	222,609	220,773
Allegheny	202,404	199,174	188,885
Pocahontas	61,447	59,716	50,350
Southern	162,905	166,255	150,607
Northwestern	113,602	117,764	115,723
Central Western	147,331	154,784	155,122
Southwestern	84,250	88,394	75,964
Total Western Districts	345,183	360,942	346,809
Total All Roads	998,715	1,008,696	957,424
Commodities			
Grain and Grain Products	47,193	58,635	52,642
Live Stock	34,142	37,411	43,240
Coal	237,735	191,950	192,394
Coke	12,034	16,317	11,313
Forest Products	63,482	72,119	71,853
Ore	10,070	12,178	11,821
Mdse. L. C. L.	258,710	259,834	248,296
Miscellaneous	335,349	360,252	325,865
December 11	998,715	1,008,696	957,424
December 4	1,058,151	1,020,839	969,485
November 27	942,792	923,206	879,131
November 20	1,078,812	1,057,923	1,010,919
November 13	1,112,886	1,049,940	1,016,843
Cumulative Total, 49 weeks	51,586,479	49,553,353	46,986,455



Dining Room Details

in a cooling tank. It finally passes through an iced coil to the faucet from which it is drawn. The water tanks are provided with a filling connection just below the car sill so that the service crew does not have to drag a hose up a ladder to the car roof when filling the tanks. The water carried in supply tank under the car can be transferred to the overhead kitchen tanks by air pressure.

A space 5 ft. 2½ in. long at the dining room end of the car is separated from the dining room by a bulkhead which provides space for the crew's and steward's lockers, linen storage, steward's records, cash, humidor, and a refrigerator for soft drinks.

A bulkhead near the center of the car defines the kitchen end of the dining room and forms one side of a space enclosing a locker for the working supply of linen, a soiled linen locker, a switchboard compartment, a fruit refrigerator, a silver locker and the buffet.

Supplies are delivered to the kitchen through a side door which includes a drop sash and screen. Dust collectors are provided on the kitchen ventilators to prevent roadway dust or cinders from entering the kitchen. An emergency steam heat valve is placed in the kitchen end passage so that yard employees may regulate the heating of the car when at terminals, without entering the pantry or kitchen. The heating system is also di-

The freight car surplus for the first week of December was 164,580 cars, an increase of 19,659 cars in a week. This included 114,182 box cars, 19,485 stock cars and 7,783 refrigerator cars, but only 15,335 coal cars.

Car Loadings in Canada

Revenue car loadings at stations in Canada in the week ended December 11 totalled 67,051 cars, a decrease of 2,606 cars from the previous week and a decrease of 2,395 cars from the same week last year.

Commodities	Total for Canada			Cumulative totals to date	
	Dec. 11, 1926	Dec. 4, 1926	Dec. 12, 1925	1926	1925
Grain and grain products ..	13,298	14,272	20,279	481,896	476,423
Live stock	3,260	3,088	2,972	112,911	121,762
Coal	9,430	9,684	7,644	310,222	222,773
Coke	474	422	469	18,744	15,277
Lumber	2,800	3,013	2,874	176,979	174,274
Pulpwood	1,509	1,147	1,634	122,193	119,217
Pulp and paper	2,270	2,211	2,302	116,105	101,880
Other forest products	3,055	3,085	2,648	150,918	137,874
Ore	1,625	1,645	1,369	86,053	70,025
Merchandise, L. C. L.	17,033	17,304	15,858	809,420	755,218
Miscellaneous	12,297	13,786	11,457	706,922	640,035
Total cars loaded	67,051	69,657	69,446	3,092,363	2,834,758
Total cars received from connections	37,376	36,827	34,292	1,830,385	1,638,225

Haile New President of M.-K.-T.

*Vice-president in charge of traffic succeeds the late
Charles N. Whitehead*

COLUMBUS Haile, vice-president in charge of traffic of the Missouri-Kansas-Texas Lines has been elected president succeeding the late Charles N. Whitehead.

Mr. Haile's election is a recognition of the long and able service of a veteran officer of the railroad. He has been connected with the Missouri-Kansas-Texas Lines during all their vicissitudes and different administrations since 1880, and always heretofore has been in the traffic department. He is not only known personally to a great part of the railway's personnel, but is one of the most widely known men to business interests throughout the Southwest. His election will be cordially received by the officers and employees of the road and, also, by its patrons with whom, in his administration of the traffic department, he has worked closely and in co-operation with whom he has contributed largely to the development of southwestern territory.

While Mr. Haile is a veteran measured by years of railway service, he is still a strong and active man. He has always been a hard worker but has found the recreation in books and out-door life necessary to keep him fit. A southern man by birth and education as well as throughout his business career, he has those qualities and tastes which often cause his friends to allude to him as a "typical southern gentleman." He became head of the freight traffic department of the railway in 1897 and very largely deserves the credit for the steady and large increase that has occurred in its freight business.

In assuming the presidency of the Missouri-Kansas-Texas, Mr. Haile is taking charge of a property which is in good physical condition, is operating efficiently and is earning money. Its condition is quite different from that under which it labored 10 years ago. The work of rehabilitation of the Katy and its firm establishment as an important and successful southwestern carrier was begun by C. E. Schaff, who retired on May 1, 1926, and was carried far along the way during his administration as president. This work was continued by Mr. Whitehead during his brief tenure of the office of president.

The entire system of 3,188 miles of line, extending from St. Louis, Mo., and Kansas City, to the southwest, was transformed into an excellent physical condi-

tion by Mr. Schaff. The improvements made involved not only great changes in the physical characteristics of the property, but also in its rolling stock and other facilities, which make for operating efficiency. These improvements had an immediate effect in bettering operating results, including reduction of the transportation ratio to 30.6 in 1925, the movement of a greatly increased number of cars per train, increases in train speed and in net ton-miles per train-hour.

The effect of this betterment of service was quickly apparent on the business and earnings of the Katy. In 1925 it earned a balance after interest on the adjustment mortgage bonds of \$6,117,619, equivalent, after allowing for seven per cent dividends on the preferred stock, to \$5.41 on each share of common stock. This compared with a balance after interest in 1924 of \$5,580,438 and in 1923 of \$2,413,699.

Total operating revenues of the Katy in 1925 were \$57,492,914, representing an increase of about \$1,500,000 over 1923. Operating expenses in 1925 were \$39,618,128, a decrease, in spite of increased traffic, of about \$4,000,000 under 1923. Net railway operating income in 1925 was \$12,825,624, an increase of about 11 per cent over the previous year.

Mr. Haile, therefore, is taking charge of a railway which is a going concern. His major duties as president will be the continuation of the Katy's present high plane of operating efficiency and the furthering of the work for increased business which he began as vice-president in charge of traffic. The future of the road will largely depend upon the outcome of its projected consolidation with the Kansas City Southern and also with the St. Louis Southwestern.

Mr. Haile was born at Carlowville, Ala., on September 8, 1867. He was educated at Hampden-Sydney College and at the University of Virginia. He entered railway service at Dallas, Tex., on October 1, 1880. He was appointed assistant general freight agent of the Missouri, Kansas & Texas at Sedalia, Mo., in 1889. From 1891 to 1896 he was general freight agent and from June, 1896, to May 15, 1897, a member of the Board of Administration of the Southwestern Traffic Association. He was made freight traffic manager in 1897, traffic



Columbus Haile

manager in 1898, and from February, 1907, to September, 1925, was also vice-president.

When the railway went into receivership in the latter year he became chief traffic officer, and during federal operation of the railways he was traffic manager of both the Missouri, Kansas & Texas and the St. Louis-San Francisco. He has been vice-president in charge of traffic again since the Missouri-Kansas-Texas came out of receivership.

Tentative Valuation Report, Pennsylvania Railroad

WASHINGTON, D. C.

THE Interstate Commerce Commission on December 20 made public its tentative valuation report on the properties of the Pennsylvania Railroad, as of June 30, 1918, placing the final value for rate-making purposes of the property used for common-carrier purposes at \$1,078,180,000. This report covers only the principal eastern lines of the Pennsylvania System, the property of the parent company, together with a portion of the leased lines, the properties of the lines west of Pittsburgh and some of the eastern lines having been covered by separate reports previously issued.

The final value of the property owned and used was stated as \$759,025,000 and that of the total owned property as \$768,970,997. The property wholly owned and used by the Pennsylvania Railroad as of valuation date comprised 2,891 miles of road and it used 1,910 miles of road not owned, including 907 miles leased from lessor companies and 1,003 miles leased from other companies. The western lines of the system were operated by the Pennsylvania Company to December 31, 1917, and were so reported in the commission's valuation report on that company as of June 30, 1916. The Pennsylvania Company on January 1, 1918, assigned its leases of the western lines to the Pennsylvania Railroad, making the latter the operating company for the entire Pennsylvania System on June 30, 1918, its date of valuation. However, the commission's report says, in order to avoid duplication, the western lines with their mileage, reproduction costs and land values have been omitted from this report, and this discrepancy will be removed when it adjusts final values to later dates in accordance with the requirements of the valuation act.

In a statement issued for publication simultaneously with the release of the commission's report, Thomas W. Hulme, vice-president of the Pennsylvania in charge of real estate, taxes and valuation, pointed out that the total assets found in the commission's tentative reports for the entire 98 companies comprising the Pennsylvania Railroad System, as of dates from 1915 to 1918, amount to \$2,563,685,568, as against a total par value of \$1,865,823,469 of all securities outstanding on the dates mentioned, of which only \$1,380,405,252 were in the hands of the public.

The total outstanding capitalization of the Pennsylvania Railroad as of valuation date is given in the report as \$807,278,304, of which \$499,178,400 represented common stock and \$308,094,335 funded debt unmatured. The investment in road and equipment, including land, on date of valuation, was stated in the books as \$701,525,531. With readjustments required by the accounting examination, the report says, this amount would be increased to \$706,551,274. The investment in improve-

ments on leased railway property was stated in the books as \$25,281,427.

Cost of reproduction new of the common-carrier property other than land and materials and supplies owned by the Pennsylvania is reported as \$724,257,903, and the cost of reproduction less depreciation as \$558,228,786. The cost of reproduction new of the total used property is reported as \$1,011,451,747, and the cost of reproduction less depreciation as \$789,815,734. The present value of carrier lands owned is given as \$129,610,201 and the present value of the carrier lands used as \$197,798,160.

The Pennsylvania owned and held "for non-carrier purposes" \$485,033,420 par value of securities of and other investments in other companies, individuals and the United States government, which were recorded in its accounts at \$387,606,620 book value. The investment in material and supplies, on date of valuation, as shown in the books of the United States Railroad Administration, covering the operation of the property of the Pennsylvania, amounts to \$54,030,044. Of this \$46,775,000 is included in the final value as owned and used on account of working capital, including materials and supplies.

Mr. Hulme's statement points out that the valuation of the Pennsylvania Railroad does not afford a complete basis for comparison between all the assets of the Pennsylvania Railroad System and the securities outstanding against these assets. In order that a comparison may be made, he says, the company has added to the valuation figures for the Pennsylvania Railroad Company proper, the commission's tentative valuation figures previously found for the other constituent companies of the system. The total so reached comprises 98 corporations with a total railroad mileage of 11,569. The statement continues:

"The dates of these previous tentative valuations were as of June 30, in various years between 1915 and 1918. The commission uniformly used a price level which it considered represented the conditions as of June 30, 1914.

"The total assets so found for the entire 98 companies comprising the Pennsylvania Railroad System were as follows:

The total of the commission's cost of reproduction now is...	\$1,853,082,782
Its value of the lands.....	436,964,924
But in addition the companies had:	
Materials and supplies.....	70,063,300
Working capital (including special deposits).....	45,842,032
and:	
Securities of corporations not operated as a portion of its system (like the Norfolk & Western Railway, etc.) which cost	157,732,530
Making a total of.....	\$2,563,685,568

"Against the foregoing figures of the system is to be placed the total par value of stocks, bonds and other securities outstanding on the dates at which the respective valuations were made. This total par value of all securities outstanding on the dates mentioned was \$1,865,823,469.

"Of the total of \$1,865,823,469, in stocks, bonds and other securities then outstanding, \$485,418,217 was owned by companies comprising the Pennsylvania System, either directly or through sinking funds, insurance or trust funds, leaving capital issues in the hands of the public of \$1,380,405,252, as against assets of \$2,563,685,568."

THE SOUTHERN PACIFIC on Christmas Day will set up decorated Christmas trees in the club cars of all its limited trains and will distribute boxes of candy to juvenile passengers. The dining car stewards, playing the role of Santa Claus, will distribute the candy.

W. R. Scott, President of Southern Pacific Lines, Dies

Heart attack at Los Angeles fatal to chief executive of Louisiana and Texas lines

WILLIAM R. SCOTT, president of the Texas and Louisiana lines of the Southern Pacific, died on December 20 at Los Angeles, Cal., while en route from his headquarters at Houston, Tex., to the headquarters of the Southern Pacific system at San Francisco, Cal. He was stricken with a heart attack while on a train near Los Angeles and died in the office of the division superintendent at that point. Although he suffered from an illness during the past year which forced him to remain in the hospital for a short time, Mr. Scott was considered by his associates to be in fairly good health until the time of his death.

Mr. Scott had been president of the Texas and Louisiana lines, which have been operated as a separate unit of the Southern Pacific, since March 1, 1920. These lines include 11 separate companies—the Houston & Texas Central; the Galveston, Harrisburg & San Antonio; the Texas & New Orleans; Morgan's Louisiana & Texas Railroad & Steamship Company; the Houston, East & West Texas; the Houston & Shreveport; the Franklin & Abbeville; the Louisiana Western; the Lake Charles & Northern; the Iberia & Vermilion and the Southern Pacific Terminal. These companies, aggregating 4,565 miles of first main track, provide a line extending from a connection with the parent system at El Paso, Tex., on the west, through Houston and Galveston to New Orleans, La., on the east, and from Houston to Shreveport, La., and to Dallas Tex., on the north. Since his election to the presidency of these lines Mr. Scott has worked constantly toward the consolidation of the 11 companies into one system and his plans for this closer grouping are expected to be consummated early in 1927.

In keeping with the general development in the southern states, the Texas and Louisiana lines have profited by the increased industrial activity in these two states during Mr. Scott's presidency. Extensive port facilities have been added at Houston, keeping pace with a growth at that point made possible by the Houston ship channel which has made it a major port on the Gulf of Mexico. Marked improvements have been ef-

fects in general track conditions with a view to bringing these properties up to the standard of maintenance prevailing on the Pacific lines of the Southern Pacific. A great deal of attention has also been given to the construction of freight car repair shops, engine terminal facilities, and the rehabilitation and extension of existing shops and terminals. At Dallas, a belt line has been constructed around the city at a cost of over \$1,000,000.

Bridges and viaducts have been strengthened to provide for the operation of heavier locomotives. In effect, practically the entire lines have undergone extensive improvement and rehabilitation.

In addition to raising the standards of maintenance of these properties, control of the San Antonio & Aransas Pass, with a total mileage of 725, extending from San Antonio to Houston and from Yoakum, Tex., to Waco, was acquired by the G., H. & S. A., a Southern Pacific subsidiary, on May 1, 1925, and in July, 1926, this company was authorized to construct 114 miles of line beginning at the present terminus of the Falfurrias branch and extending in a general southerly direction to the Mexican border and including a branch line extending from Edinburg, Tex., to Harlingen.

Since the termination of federal control, the Texas and Louisiana lines have shown steady progress in earnings. In 1921, the first full year in which Mr. Scott served as chief executive, operating revenues of four main units in these lines—the Galveston, Harrisburg & San Antonio, the Houston & Texas Central, the Louisiana Western and the Morgan's Louisiana & Texas, comprising 3,643 miles of first main lines—aggregated \$53,084,702. Except for a drop to \$50,178,220 in 1922, the total operating revenues of these units advanced steadily to \$55,067,187 in 1925. In the latter year these lines suffered a loss of freight traffic due, principally, to a severe drouth in Texas which held down the production of cotton and its by-products, and of corn, wheat, oats and other agricultural products. Passenger traffic also suffered from the unfavorable business conditions produced by the drouth and from increased automobile competition.



W. R. Scott

Operating expenses for these four lines in 1925 were \$43,183,061, showing a decrease of approximately \$3,000,000 under the figure for 1921, which was \$46,181,818. Net railway operating income, or net after equipment and joint facility rents and before the deduction of interest and other charges, was \$2,790,054 for the four lines in 1921, as compared with \$5,517,048 in 1923, \$8,306,934 in 1924 and \$6,954,189 in 1925. Surplus increased from a deficit of \$864,541 in 1921 to a surplus of \$4,078,768 in 1925.

William R. Scott was born on November 8, 1860, and first entered railway service as a locomotive fireman on the Atchison, Topeka & Santa Fe in 1881. On July 12, 1884, he was promoted to locomotive engineer, serving for seven years when he was promoted to traveling engineer. Mr. Scott was appointed a trainmaster on the Northern division of the Gulf, Colorado & Santa Fe on August 15, 1898, advancing to division superintendent with headquarters at Cleburne, Tex., on June 1, 1900. The following year he became general superintendent of the Ft. Worth & Denver City, where he remained until September, 1903, when he was appointed assistant superintendent of the Sacramento division of the Southern Pacific. In November of the same year he was promoted to superintendent of the Salt Lake division and on June 1, 1905, he was transferred to the Western division.

He was promoted to general superintendent of the Northern district on September 1, 1907, and again promoted to assistant general manager two months later. After nearly seven years in this position he was appointed general manager on July 15, 1912. From February, 1914, to July, 1918, he served as vice-president in addition to general manager. During federal control Mr. Scott acted as federal manager of the Southern Pacific, the Western Pacific, the Deep Creek and the Tidewater Southern from July, 1918, to March 1, 1920, and upon its termination he was elected president of the Texas and Louisiana lines of the Southern Pacific, with headquarters at Houston, which position he held continuously until his death.

Shippers and Carriers Readjust Class Rates

WHAT is probably the most successful attempt within the last 20 years of shippers and railways jointly to work out a schedule of freight rates without the aid of the Interstate Commerce Commission, is occurring in the western trunk line territory. The proposed schedule of revision worked out by the Shippers' Steering committee of the western trunk line territory was submitted to and approved in part by a general meeting of shippers on December 16 at Chicago.

Following the application of the western carriers asking the Interstate Commerce Commission to readjust class rates within the western trunk line territory, Docket 17,000, Ex Parte 87, Sub 1, it was decided at a general meeting of representatives of shippers, receivers and commercial organizations held at Chicago on May 25, 1925, to carry on negotiations with representatives of the carriers in order to reach an agreement for a permanent revision of class rates within western trunk line territory and thereby avoid a general investigation of such rates by the Interstate Commerce Commission and state commissions. The Shippers' Steering committee was appointed to work out new rates. The mem-

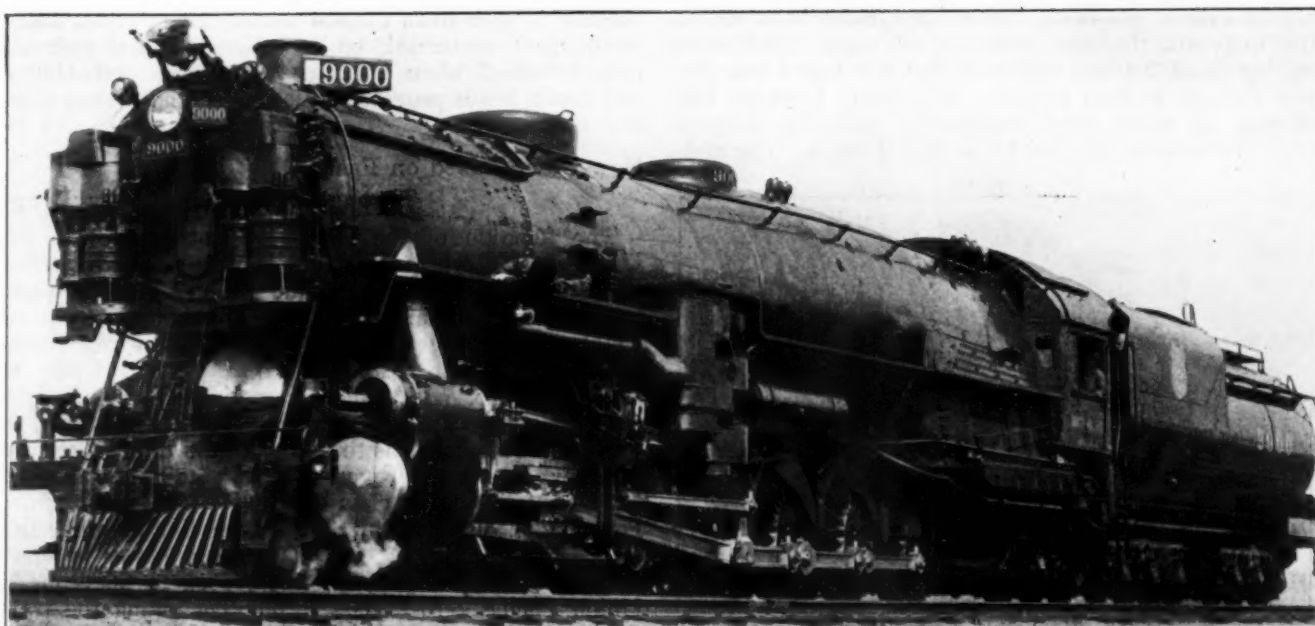
bership of the committee includes 30 individual shippers and representatives of commerce associations.

After numerous meetings with representatives of the carriers and an equal number of committee meetings, the steering committee submitted on December 16 comparisons of class percentage relationships, class rate scales and class rates between representative points. The proposed rates are established on a distance basis, and with a few exceptions are higher than the old rates. In establishing the proposed rates, the territory was divided into two sections, that east of the Missouri river-Twin Cities-Duluth line and that west. The basic scales on which it is proposed to construct class rates are east and west. The east scale will apply on and north of the Chicago, Rock Island & Pacific line from St. Louis to Kansas City and thence on and east of the Missouri river from Kansas City to Omaha to Sioux City and on the Chicago, Milwaukee & St. Paul to Sioux Falls; on the Chicago, St. Paul, Minneapolis & Omaha through Worthington to the Twin Cities, thence on and east of the Great Northern to Minneapolis, through Cambridge to Hinckley and thence on the Northern Pacific to Duluth. The west scale will apply in Kansas and Nebraska, South Dakota east of the Missouri river, Minnesota north and west of the line described in the east scale and in North Dakota on and east of the Chicago-Jamestown line. Provision is also made for through rates from points east to points west of the east scale boundary line in Kansas, Nebraska, South Dakota and North Dakota, and for rates from St. Paul, Minneapolis and Duluth to points in North Dakota west of the Fargo-Jamestown line.

The report submitted by the Shippers' Steering committee on December 16 was approved with exceptions. The meeting accepted the proposed scale east of the Missouri river, Twin Cities and Duluth, with the percentage relationship of the classes, grouping and methods of computing mileage as tentatively agreed upon provided that this acceptance shall not be construed as prohibiting the establishment of lower rates, either class or commodity, between particular points where water competition, commercial competition or other conditions may warrant departures from the scale and provided further that this acceptance is continued upon the establishment of properly related adjustments including, (a) on intrastate traffic; (b) in the territory west of the Missouri river, Twin Cities and Duluth; and (c) for overhead application between the territory east of the Missouri river, Twin Cities and Duluth, on the one hand, and the territory west thereof, on the other.

A motion to disapprove the carriers' proposed scale for application west of the Missouri river, Twin Cities and Duluth was carried for it was felt that these rates were too high. The meeting also disapproved the carriers' proposed basis of rates for application between the territory east of the Missouri river, Twin Cities and Duluth on the one hand, and the territory west thereof, on the other, on the grounds that the rates were inconsistent. The steering committee was authorized to continue its negotiations with the carriers.

THE DELAWARE & HUDSON RAILROAD CLUB, Pennsylvania division, held its regular monthly meeting at Carbondale, Pa., on December 7, with papers by H. L. Symons, road foreman of engines, and J. W. Howard, divisional car foreman. C. A. Morgan, superintendent, was elected president of the club for the ensuing year. The secretary is D. J. Buckley, division accountant. This club, composed of supervising officers, meets on the first Tuesday of each month from October to May inclusive.



The First of 15 Three-Cylinder, Six-Coupled Locomotives Now in Service on the Union Pacific

Union Pacific Type Locomotive Performance

Little maintenance difficulty encountered compared with gain in power and fuel economy

IN response to the urge for greater unit locomotive hauling capacity, increased train speeds and fuel economy, engineers of the Union Pacific, in conjunction with those of the American Locomotive Company, developed the three-cylinder, six-coupled locomotive known as the Union Pacific type, 15 of which are now in service on the Union Pacific System. The management anticipated that operating economies resultant from the use of this power might be offset to some extent by increased maintenance cost, and owing to the present limited experience with the new locomotives, it has not yet been fully demonstrated that this may not be the case. The indications are, however, that on a tractive force basis, the maintenance cost will not greatly exceed that of two-cylinder locomotives and in fact, it may be less owing to better distribution of the loads and working stresses.

The first of the new locomotives, No. 9000, was placed in service in May, 1926, and the others as fast as delivered. They were immediately assigned to heavy road service at a time when business was at its peak and all power was undergoing a severe test, but surprisingly

few troubles developed—less, if anything, than could be expected of an established design. It would be a misstatement, and one not authorized by Union Pacific officers, to say that no difficulties have been encountered in keeping the 9000 class locomotives in operation. There has been one inside main rod failure, one case of a dry, scored cylinder, a few hot main bearings and some stoker trouble, largely owing to lack of lubrication. The lubrication of the air compressors, located as they are, high up on the boiler front, has also presented a problem which is now in a fair way to be overcome. An analysis of the records shows that these maintenance difficulties, whether chargeable to improper design, defective material or unfamiliarity of railroad forces with the new locomotives, are not more than would be expected when any new class of power is first put in operation under peak business conditions.

An important factor in the good performance secured with the 9000 class locomotives has been the careful inspection and performance of necessary repair work at regular monthly periods, in accordance with customary

SELECTED RUNS MADE BY LOCOMOTIVE 9000

Stations	Distance in miles	Run. time hrs. min.	Speed in m. p. h.	Total no. of cars	Tons in train	Total g. t. m.	Lb. coal per 1,000 g. t. m.	Lb. coal per sq. ft. grate	Actual evaporation per lb. coal
Rawlins—Laramie	117	5-12	22.2	62	4,262	498,654	74	63.5	7.21
Rawlins—Laramie	117	5-18	20.3	63	4,394	514,098	74	65.7	6.56
Rock Springs—Wamsutter	72	3-55	...	78	5,498	428,844	68	76.6	6.57
Wahsatch—Laramie	361	14-7	25.6	72	3,566	1,291,000	66.8	56.6	...
Wahsatch—Laramie	361	13-14	27.4	78	...	1,214,896	68.9	58.4	...
Wahsatch—Cheyenne	418	17-16	24.2	78	...	1,413,370	75.4	57.1	...
Rawlins—Laramie	117	5-52	20	91	4,334	507,078	65	52.0	6.45
Rawlins—Laramie	117	4-51	24	85	3,978	465,426	73	65.0	6.73
Rawlins—Laramie	117	5-53	20	67	4,265	497,005	67	52.1	6.44
Rawlins—Laramie	117	6-21	18	62	4,130	483,210	71	50.6	6.9

Union Pacific practice. These inspections have shown that in general the inside main rod will make 12,000 miles per boring of the back end brass, but it is hoped that certain changes now in progress will permit bringing this mileage up more nearly comparable with that secured from the outside rods, which is 50,000 miles. The mid-

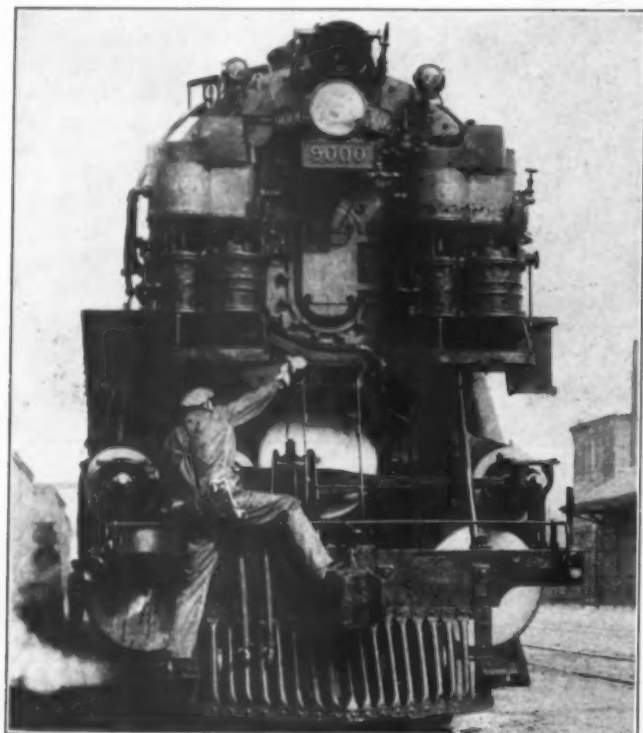
planned to give them Class 4 repairs after 60,000 miles, involving tires turned, boxes rebored, lateral reduced, rods rebushed when necessary, crossheads, rebabbitted and piston heads provided with new special bronze faces if necessary.

New Power Used on Fast

Through Trains or Heavy Drags

The function of the 9000 class locomotives in the Union Pacific scheme of train handling may be better understood by glancing at the profile. All through-traffic in fruit or manifest freight is made up in trains of 3,800 tons average weight, or 4,300 tons maximum, and run through eastbound from Ogden, Utah, to Laramie, Wyo. A Mallet locomotive and helper take each train up the 63-ft. grade from Ogden, Utah, to Wahsatch; the helper is then cut off and the Mallet runs through to Green River, Wyo., a total distance of 175.8 miles. A 9000 class locomotive takes the train to Laramie, encountering numerous ascending and descending grades up to 43 ft. per mile, and a Mallet is again used over the hill from Laramie, Wyo., to Cheyenne, a Union Pacific 2-10-2 class locomotive taking the train east from Cheyenne to North Platte, Neb. At Laramie part of the business is diverted to Denver, Colo., so it cannot be said that through trains are handled all the way from Ogden, Utah, to North Platte, Neb., and Omaha, although this may sometimes be done.

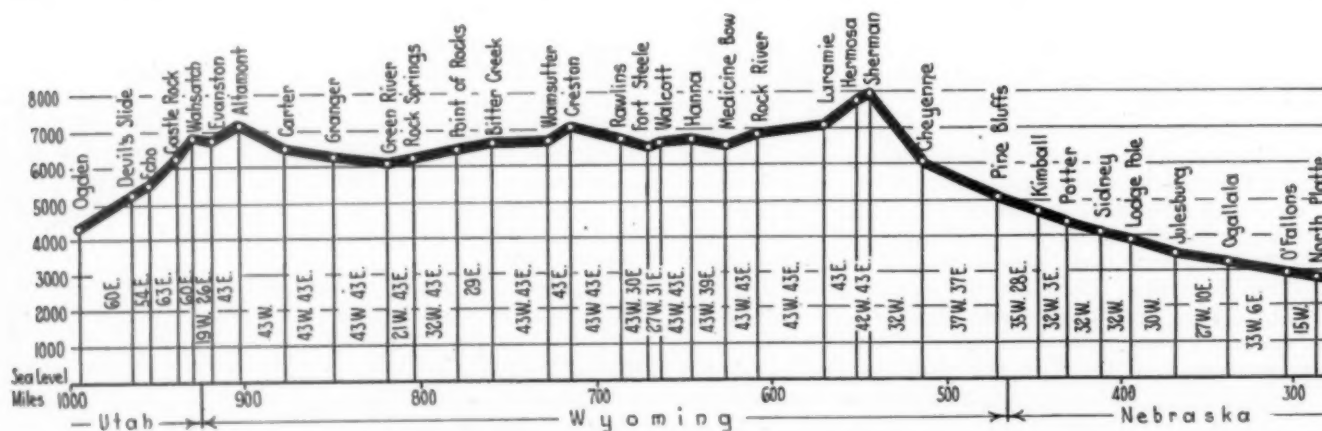
In addition to fruit and manifest trains, the 9000 class locomotives also handle heavy coal trains up to 6,700 tons over the ruling one-half per cent grades from Rock Springs, Wyo., to Wamsutter. A detail record of one of the best of these runs, taken from the dispatcher's record, is as follows:



Lubricating the Inside Cylinder Valve Motion of Locomotive 9000

dle crosshead makes 25,000 miles before requiring new babbitt and planing to take up wear. Driving box brasses will apparently go from shopping to shopping, or 60,000 miles, without reboring, and the tires also will make this mileage as they have only $\frac{1}{8}$ in. wear on the tread at 33,000 miles, and show no evidence of cutting the flanges. It has not been neces-

Locomotive 9005—October 16.
Green River to Rawlins—134.2 miles.
Left Green River at 1 p. m. with pick-up train of 695 tons.
Arr. Rock Springs at 1.47 p. m.
Took coal and water; set out 9 loads and 13 empties; picked up caboose and 95 cars of coal, or 6,778 tons.
Left Rock Springs at 2.25 p. m.
Stopped 15 min. at Bitter Creek for coal and water; stopped 40 min. at Monell to let two passenger trains pass.
Arr. Wamsutter at 6.50 p. m.
Let two fruit trains pass; reduced to 53 loads, or 3,850 tons.
Left Wamsutter at 7.55 p. m.
Delayed 20 min. at Hadsel to let silk train pass.
Arr. Rawlins at 10.05 p. m.
Total elapsed time..... 9 hr. 5 min.
Total delays..... 2 hr. 55 min.
Running time..... 6 hr. 10 min.



Partial Profile of U. P. System—9000 Class Locomotives Now Operate Between Green River, Wyo., and Laramie

sary to take up engine truck or trailer lateral play, which is now about $\frac{1}{2}$ in. The blind tires on the No. 4 wheels of Locomotive 9000 have been proved unnecessary. In general, these locomotives operate with unusual freedom from vibration, side sway or nosing. They steam freely and respond with promptness to the throttle. It is

A total of 696,959 gross ton miles was earned by the locomotive on this run in 6 hr. 10 min., actual running time. Between Rock Springs and Wamsutter, 528,684 gross ton miles was earned in 3 hr. 30 min., actual running time. No officer was on the train nor was any effort made to secure an unusually good performance.

Faster time is made with the fruit trains, one of which, for example, with 75 cars totaling 3,350 tons, on November 28, made the run from Green River to Wamsutter, 92.8 miles without stopping for water or coal. The time was 3 hr. 11 min., and the average speed practically 28 m.p.h. At no time during the run was the speed restriction of 35 m.p.h. violated. The consumption of water on this trip was 15,000 gal. and coal, 15 tons.

Other selected runs by Locomotive 9000 are shown in the table which indicates that coal consumptions as low as 65 lb. per 1,000 gross ton miles are obtained at a coal rate of 52.0 lb. of coal per sq. ft. of grate area per hour. On the last four runs the average evaporation per pound of coal as fired was 6.54; dry actual, 7.26 lb.; dry equivalent, 8.83.

It was pointed out by O. S. Jackson, superintendent of motive power, in a recent address before the Traveling Engineers' Association at Chicago, that these locomotives produce 80 per cent more ton-miles per hour than Mallets of similar starting power and do it on slightly less than one-half the fuel on a gross ton-mile basis. On one test run Locomotive 9000 earned over 1,640,000 gross ton miles in a single trip from Ogden to Cheyenne.

Proposed Safety Schools for Foremen

DURING the last few years, safety councils in a number of the large cities of the country have established safety instruction schools for foremen. These schools are addressed by safety experts and are attended by plant superintendents and foremen from all kinds of industries. Reviewing the successful operation of these schools, T. H. Carrow, chairman of the committee of direction of the Safety Section of the American Railway Association, has issued a circular (No. 142) urging all railroads to establish schools of this kind. Mr. Carrow's circular is substantially as follows:

These schools have become very popular and it is evident this method of developing interest in the key men of safety has been most successful.

A course usually consists of six lectures, one being given about every other week, a lecture and the discussion consuming one hour and a half. For the purpose of illustration there is shown below the program of the school recently held under the auspices of a Council in one of the large cities:

September 17, 1926: Foremen's place in accident prevention, by a safety officer.

October 1, 1926: Plant condition, by a mechanical engineer.

October 15, 1926: Educating the workmen, by a plant foreman.

November 5, 1926: Physical safeguards, by a mechanical engineer.

November 26, 1926: Workmen's inspection committees, by a supervisor of safety.

December 10, 1926: Physical man and safety, by an industrial physician.

There is good reason to believe a safety instruction school or some other arrangement designed to accomplish the same purpose on each division or in each shop of the railroads, developed to suit local conditions, would be just as effective in educating the supervisory forces of the railroads along safety lines as the schools that have been conducted in the cities throughout the country during the last few years have been in educating the supervisory forces of industrial plants.

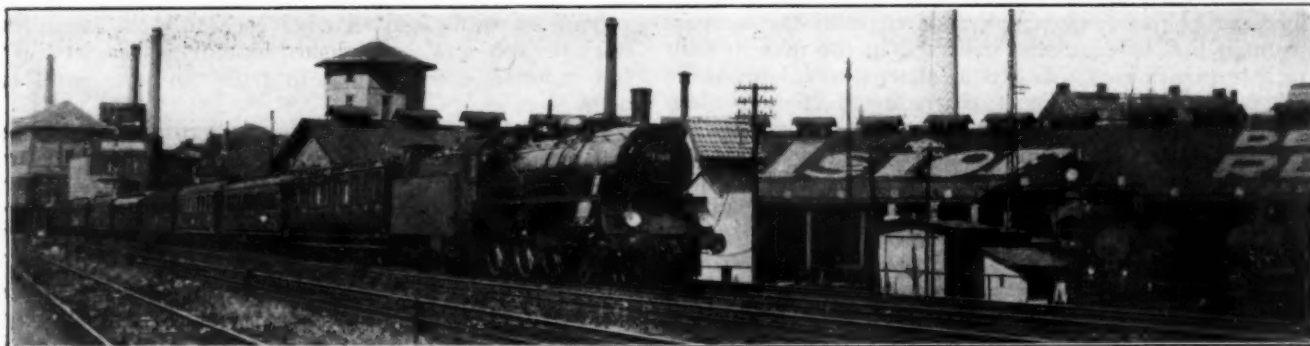
It is realized, of course, that the preparation of a program and the arrangement for speakers, instructors or examiners would have to be made in accordance with local conditions. But this is highly to be desired, in that it would make it necessary for each unit of the railroads to utilize its own facilities and talent which would not otherwise be done.

It is therefore respectfully recommended that consideration be given by each railroad to the inauguration of safety instruction schools or their equivalent for foremen and other supervisory forces, including assistant staff officers, on each division or in each shop; that the schools be inaugurated as soon as suitable arrangements can be made and that the first course be completed on or before April 1st, 1927.

In developing the plans for the schools or their equivalent, consideration may be given to conferences of staff officers, air brake instructors, examiners and safety agents to work out details and eliminate any lost motion that may otherwise develop. The methods employed in air brake and signal instruction and examination on the book of rules provide helpful precedents.

It is not the intention to have the foremen's safety school interfere with the regular duties of the supervisory forces to any appreciable extent but rather to systematize the efforts now being put forth, with the view of making them more effective. The reduction in accidents that should result from systematic, concerted action along the lines outlined will reflect great credit upon the railroad business as a whole and minimize the hazard of employment.

Comments or advice as to action taken are solicited.



A Paris-Warsaw Express Train in Germany

Western Railway Club Has Unusual Program

Technical paper by W. E. Woodard effectively illustrated by "animated" charts and statistics

THE Western Railway Club witnessed at its December meeting in Chicago an unusually striking presentation of a strictly technical paper. W. E. Woodard, vice president of the Lima Locomotive Works, Inc., discussed the subject, "Engineering and Recent Locomotive Developments," and brought to his aid in making the subject clear not only moving pictures and graphical illustrations on a screen but statistics and charts in the form of animated pictures, the significance of which could be quickly and easily grasped.

Mr. Woodard's general method was to show moving pictures which forcefully illustrated important points in his paper and then let the pictures tell the story, discussing them only as much as necessary to indicate the continuity. The animated drawings lent themselves especially well to showing just how various performance charts were developed, and frequently conveyed important information in a fraction of the time which would have been required for verbal presentation. As a rule each group of animated drawings was summed up in a fixed lantern slide which could be studied more at leisure. In all, 20 moving picture scenes and 26 lantern slides were shown. An abstract of the paper follows:

Recent Locomotive Developments

By W. E. Woodard,
Vice President, Lima Locomotive Works, Inc.

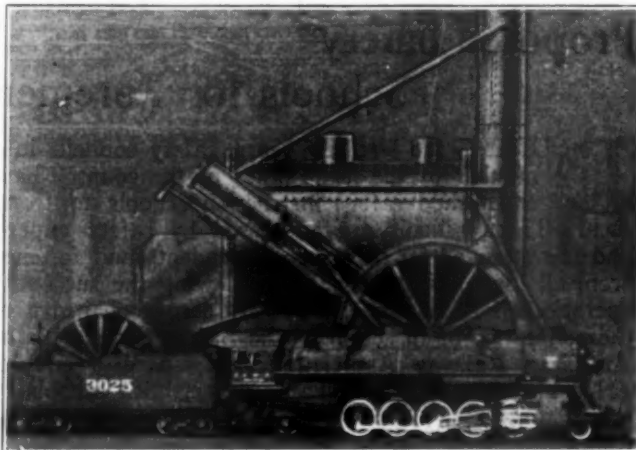
Even a casual study of the growth of American railways during the past 20 years develops many subjects of interest to the engineer. During this period the railways have, to a notable degree, made use of the products of scientific and engineering research for the improvement and more efficient use of their transportation plants, and thus any study of our railways leads at once into the field of engineering.

In such a survey of rail development, one fact stands out prominently, namely, that while main line track mileage has not materially increased during the past 20 years, there has been an enormous increase in the amount of business handled, and that the railroads have only been able to handle this increase by vastly increasing the traffic capacity per mile of track operated. (This increase in traffic capacity compared with the increase in main line mileage was indicated in the first moving picture, which was followed at short intervals by three others showing the effects of grade reduction, modern signaling and hump yard car retarders in making this greater traffic density possible.—Editor).

In this traffic expansion, the advance is steam locomotive design has contributed its full share by increasing the size and speed of trains, and has been the largest single factor in making this expansion possible. It would be an interesting story did time permit to trace the evolution of the locomotive from the "Rocket" to the modern power plant on wheels. The modern locomotive contains the same essential elements as the "Rocket"—an internally-fired steam boiler, cylinders and

wheels—but this combination unaided by the developments which steam engineering has produced since Stephenson's time would be ludicrously inadequate for our requirements.

Superheating, feedwater heating, mechanical stoking, high boiler pressures, all helped in this evolution. They have largely made possible the production of locomotive designs capable of meeting modern traffic conditions. Fine locomotives were being built embodying these and other improved features of design and were bettering by large margins the performance of typical locomotives of 10 or 15 years ago. However, it was be-



Imaginary "Rocket" with Power Equivalent to that of a Modern Locomotive

coming apparent to students of locomotive engineering that we had about exhausted the possibilities of these combinations for further improvement, particularly as we were up to the limits of wheel loads and physical clearances in almost all of our locomotives. This was the reason for starting the series of tests and experiments which I will illustrate for you and by which we hoped to find ways still further to advance the locomotive art.

The natural approach to this problem was a survey of the trend of operating requirements. The increase in the volume of traffic moved over each mile of main line track per day was accomplished by moving heavier trains faster, which is an increase in gross ton-miles per train hour.

The increase of 123 per cent in gross ton-miles per train hour in the past 20 years means that there has been a proportionate increase in the power output of the locomotives required to do the work. The increase in the power output of the locomotives is not exactly proportional to the increase in gross ton-miles per train hour, as factors such as better signaling and train operation have had some effect. However, without going into an extended analysis of these figures, it can safely be stated as a fact that the increased power demands upon the locomotive during this period are nearly pro-

portional to the increase in gross ton-miles per train hour.

Now, power output demands steam, and steam requires coal for its production. Thus, logically, the first step toward improving locomotive designs led to a study of combustion conditions in road service. It had been apparent for some time past that we were reaching a very definite limit in steam generating capacity of our locomotives, because of the fact that the firebox and grate area set a limit to the amount of coal that could be burned and, in turn, the size of grate was fixed by the weight which could be carried on one trailer axle. Moreover, this trailer axle generally had to carry a stoker, a heavier ashpan, and often a booster.

An example will illustrate what I mean by the firebox and grate limitation. A railroad came to us with this problem: It was necessary for them to use two Pacific type locomotives over certain parts of their line in order to make the schedule of their through passenger trains. They wished to get one locomotive capable of doing the work. An analysis of the power output required to pull the train and a study of the proportions of the locomotives revealed the fact that while the cylinders of one engine were capable of developing the required power, the grate and fire box were totally inadequate to generate the amount of steam needed for the power output. Two engines had to be used in order to get a combined grate area sufficient to produce the steam required to pull the train, even though the cylinders on one engine could produce the power. The size of the grate and firebox absolutely limited the work which these locomotives could do.

It is a familiar experience to most of you to see a locomotive, when being pushed hard, reach a point where it seems to quit. It really does. The firebox has reached the point where it cannot digest any more fuel, and no additional power can be coaxed out of that locomotive, irrespective of how much coal is fed to her.

Thus, you will see the logic of going after the combustion situation in locomotive designs. Cylinder proportions might be increased, steam pressure raised, driving wheels added, but to what avail if the grate is not made big enough to burn the coal necessary to produce the steam demanded by the increasing gross ton-miles per hour. This was the reason for the introduction of the four-wheel trailing truck.

Tests showed that with a grate area of 66.4 sq. ft., an average Mikado locomotive boiler has a maximum capacity of 65,520 lb. of steam per hr. while the Lima A-1, 2-8-4 locomotive boiler, with a grate area of 100 sq. ft. and burning the same amount of coal has a maximum steam capacity of 74,450 lb. per hr.

These tests and studies were directed to an investigation of the combustion conditions in locomotives; they were concerned with the steam-producing portion of the locomotive. What follows relates to our studies of the steam-using portion, *i. e.*, the cylinders and machinery.

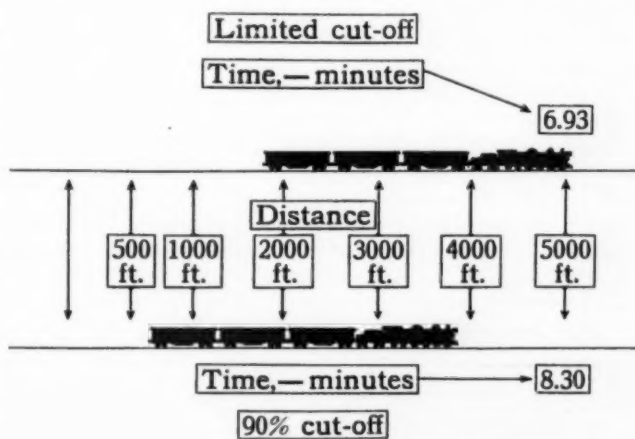
For years various attempts had been made to improve the efficiency of the engine cylinders in using steam. Superheating made the greatest advance in this direction by reducing cylinder condensation and thus saving steam. Compounding and uniflow cylinders represent less effective efforts in the same direction.

Limiting the maximum cut-off in the engine cylinders was being practiced by one large railway system and, without doubt, was reducing steam consumption. It did this because limited cut-off engines run at a shorter average cut-off than full-stroke engines and thus secure the advantage of a more expansive use of the steam. While the economy of these locomotives was

well known, the possibilities of the limited cut-off scheme for increasing the power output per unit of driving wheel weight did not appear to be recognized.

When we began to consider the use of limited cut-off as a means of improving locomotive design, there was one question about its use which was not fully answered; namely, would a locomotive with limited cut-off get away as quickly and accelerate a train as rapidly as a full-stroke locomotive of equal starting effort? Possibly the sound of a full-stroke locomotive pulling its train out of a station led some to believe that it would accelerate faster than the less noisy and thus, apparently, less energetic limited cut-off locomotive. The answer to this question is given in one of the drawings.

The use of limited cut-off necessarily involved heavier piston thrusts, because more power is being produced from a cylinder of given size. This led, logically, to a study of rod and pin conditions. No elaborate data



Acceleration Improvement with Limited Cut-off

is needed to convince this audience that the conventional design of locomotive rods and pins has reached, if not passed, the limit of power which this construction can carry. Various cures for hot pins and brasses, like floating bushings, are used, but they do not get at the root of the trouble. The cause is not removed; the effect is only made less troublesome.

And thus it was that in 1924 we made a set of experimental rods and tested out in service a new scheme aimed to remove the design limitation set by the conventional rod drive by transmitting the piston thrust to driving wheels back of the main wheels without having it go through the main crank pins. Service tests showed that the new rods ran successfully and met all road and maintenance conditions. This form of rod drive is in use on about 150 locomotives in this country and is also being tried out in England.

I have pointed out the vital importance of power output in locomotive design. As weight limits have remained about stationary and as the boiler and firebox are the primary sources of power in a locomotive, it naturally follows that if we can reduce the weight of any of the parts outside of the boiler and put that weight into the boiler, we will be increasing the power output by the amount of boiler added.

Until 1924 little had been done with cast steel locomotive cylinders. As many of you know, steel cylinders had been made, but their use was certainly not encouraged by the producers of steel castings. With the help of the Ohio Steel Foundry Company, we produced a cast steel cylinder design which overcame the objections of the foundry people, and to try out its prac-

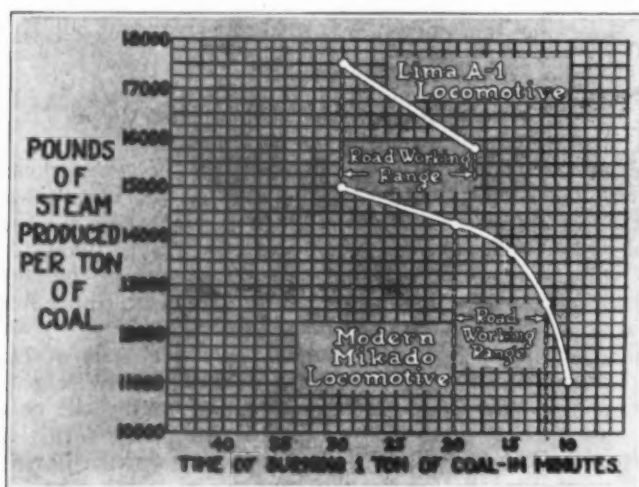
ticability a set was made, machined and tested. The weight saving was more than 4000 lb. per pair of cylinders over those made of cast iron.

Large numbers of this design of cylinder have been produced and there now appears to be very little difficulty in getting either this or the conventional design in cast steel.

After these studies and experiments assured us of the correctness of our ideas, the various elements were combined and developed into a complete locomotive design, which one of the large railway systems of the country had the enterprise and courage to assure us they would try out. The engine was built and the design is now represented by 105 locomotives in service. To what degree the design has met expectations can best be shown by its accomplishments.

To be sure this locomotive is more complicated than the engine of a few years ago, but what machine can be mentioned that has not become more complicated as its range of usefulness and accomplishment has been extended? While I do not remember having heard the term "full-jeweled" applied to this locomotive, it has been used to describe many modern designs by persons who evidently failed to grasp the significance of the engineering advance represented by what they were pleased to call "jewelry." It is evident that as the requirements of safety, rapidity, and efficiency of operation, as well as the amount of work to be done, advance, machinery to meet these requirements becomes more complicated. The intricacies of a New York subway car are relatively great but it represents the most intensive, safe and economical transportation in the world.

After breaking in the A-1 on the Boston & Albany,

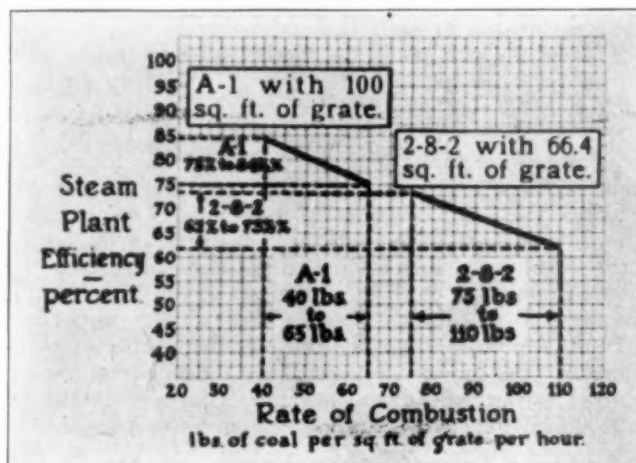


Effect of Large Grate Area on Boiler Capacity and Steam Production

extensive dynamometer car tests were made. These results were comparable with similar tests made about one year previous with a 2-8-2 locomotive of thoroughly modern design, having a Type "E" superheater, a feedwater heater, and a booster. The comparison is of special interest, because the two locomotives had almost exactly the same driver-wheel weight. The figures used in the following chart are average for a large number of runs of each locomotive. Weather conditions favored the 2-8-2, as the tests of that locomotive were run in August, while the A-1 tests were run in late winter.

STEAM PRODUCED PER HOUR, LB.			
Lb. coal per hour	2-8-2 66.4 sq. ft. grate	A-1 100 sq. ft. grate	Increased by A-1 with large grate area
5,000	36,200	42,000	5,800 lb.
5,500	39,600	45,000	5,400 lb.
6,000	42,600	48,000	5,400 lb.
6,500	46,000	51,000	5,000 lb.

The range available for overload in the boiler having the big grate and firebox is illustrated, being made possible by the four-wheel trailer truck design. The relative usefulness of the two boilers can best be shown by the overall efficiencies of the boiler, superheater, and feedwater heater in combination. Both boilers have Type "E" superheaters and are equipped with feedwater heaters of the same type; therefore, the comparison is a fair one, and by reducing the comparison to an ef-



Effect of Large Grate Area on Steam Plant Efficiency

iciency basis the difference in steam pressure is accounted for.

Passing to the steam-using portion of the locomotive, some very interesting comparisons were obtained showing the effect of the limited cut-off on steam consumption. As I have said, the tests of the 2-8-2 type locomotive were run over the same division as those of the A-1, with about the same train loading. The results of the limited cut-off may be summarized as follows:

AVERAGE SAVING OF 17½ PER CENT BY USE OF LIMITED CUT-OFF

A-1 (60 per cent maximum cut-off)

Indicated horsepower (Avg. over division)	Total water per hour, lb.	Steam per i.hp. hr., lb.
1,800	37,400	20.8
1,900	39,200	20.6
2,000	41,200	20.4

2-8-2 (90 per cent maximum cut-off)

Indicated horsepower	Total water per hour, lb.	Steam per i.hp. hr., lb.
1,800	44,700	23.8
1,900	46,900	24.7
2,000	51,200	25.6

We have found from many years of experience in building locomotives that while economy in fuel is very essential consideration in any new locomotive unit, it alone is not enough. A factor of equal if not greater importance is increased capacity to pull cars.

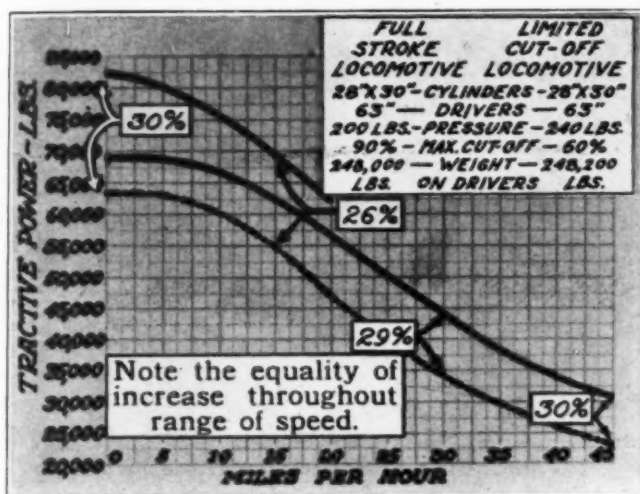
High-pressure, limited cut-off cylinders increase the capacity of the locomotive in two ways. First, by raising the starting power of the engine on account of the more even torque, which permits the use of more tractive force on a given driver-wheel weight. With limited cut-off we are able to get about 30 per cent more pull at speed than can be obtained out of the same driver-wheel with full-stroke cylinders.

The tractive force which can be obtained out of this driver-wheel weight with full-stroke cylinders is very definitely set by the factor of adhesion and it is about 63,000 lb. The amount of pull at speed which can be obtained out of these full-stroke cylinders has also been well established for years past. For example, full-stroke cylinders giving a starting tractive force of 63,000 lb. will give a pull of 34,000 lb. at 30 miles per hour, and this is all that can be obtained out of these cylinders at that speed. Now, with limited cut-off we get a starting tractive force of 69,400 lb., but at

30 miles an hour these limited cut-off cylinders will give about 44,000 lb.

You have seen how the limited cut-off cylinders increased the power output at speeds and how we utilized the booster to add pulling capacity at low speeds, thus maintaining the increase throughout the entire speed range of the locomotive.

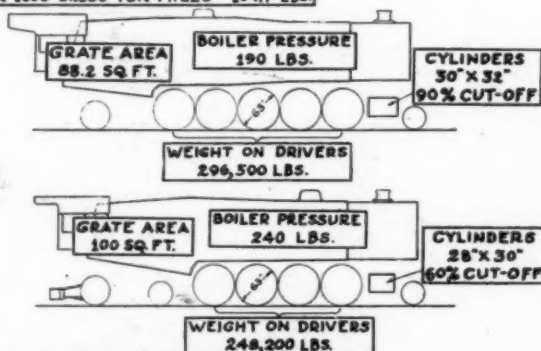
Now, this increase in power over the full-stroke en-



Comparison of the Tractive Force of a Full Stroke and a Limited Cut-Off Locomotives of the Same Weight on Drivers

gine having the same driver-wheel weight corresponds very closely with the increase which can be obtained from a full-stroke cylinder locomotive having one more pair of driving wheels and larger cylinders. In other words, if this curve be true a 2-8-4 having four pairs of driving wheels, plus the booster, ought to equal in service a 2-10-2 full-stroke locomotive having five pairs of driv-

TEST RESULTS	
TONS IN TRAIN (AVERAGE)	4952
GROSS TON MILES PER TRAIN HOUR	48590
COAL PER 1000 GROSS TON MILES	104.7 LBS.



TEST RESULTS	
TONS IN TRAIN (AVERAGE)	5251
GROSS TON MILES PER TRAIN HOUR	60700
COAL PER 1000 GROSS TON MILES	65.86 LBS.

Comparison of Test Results of the A-1 and a Modern 2-10-2 Locomotive on the Illinois Central

ing wheels and no booster. It actually works out this way, as is shown by the following data comparing the A-1 locomotive and a 2-10-2 locomotive of good modern design.

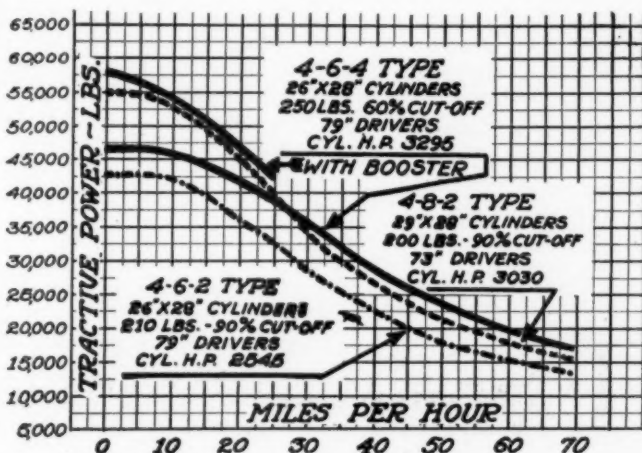
This is simply another verification of the fact which I have emphasized many times; namely, the use of high-pressure, limited cut-off cylinders backed up by an adequate boiler gives greatly increased power output per

unit of driver-wheel weight over a full-stroke engine.

These same principles of design are applicable to any class of locomotive. For example, the following diagrams will show what happens to a 4-6-2 class locomotive when designed with cylinders capable of high horsepower output and a boiler to suit.

In any talk where improved elements of construction are discussed, very frequently and very properly someone asks the question, "What next?" We ought to keep our minds open and always be looking ahead. In that respect, I feel that the question is a proper and desirable one. But there is one other aspect of this question—"What next?" that I would like to present to you.

(Mr. Woodard here presented a moving picture showing graphically that as compared with a capacity of 100,000 gross ton miles per hour and dry coal consumption of 3 lb. per drawbar horsepower-hour for the A-1 type locomotive, 31½ per cent of the freight power in the country produces but 60,000 gross ton miles per hour at 5½ lb. of coal per drawbar horsepower-hour, and 61½ per cent of the freight power but 45,000 gross



Comparison of the Tractive Force of a Full Stroke Pacific, a 4-6-4 and the 4-8-2 Type Locomotives of the Same Weight on Drivers

ton miles per hour, at 6½ lb. of coal per drawbar horsepower hour.

Discussion

The discussion of Mr. Woodard's paper was opened by A. P. Pendergast, mechanical superintendent of the Texas & Pacific, who stated that after an investigation of several years concurrent with the operation of three groups of well designed locomotives of the 2-10-2 type, it was decided to install high pressure, limited cut-off locomotives of the 2-10-4 or Texas type. Ten of the locomotives were delivered in December, 1925.

After a year of operation each locomotive has made about 50,000 miles of the tentatively assigned mileage of 60,000. No wheels have been dropped or tires turned and inspection at the first annual test of these locomotives indicates that the flues were in good condition and there were no broken staybolts of any kind. On account of bad water and severe operating conditions, the life of flues on previous types of locomotives has been limited to an average of 35,000 miles, whereas the condition of the Texas type flues indicate that they will be in good condition at the run-out of the assigned mileage of 60,000 miles. Notwithstanding the high piston thrust of these locomotives, rod bushing maintenance has been much lower than on the 2-10-2 type, as renewals were not necessary until 24,000 miles had been run, against

15,000 miles for the 2-10-2 type. Lubrication of valves and cylinders by force feed lubricators has been entirely satisfactory.

As a summary of maintenance expense, the cost of running repairs for mileage run has been \$0.194 per mile as compared with \$0.273 for 2-10-2 engines in the same average condition.

The outstanding result of this design has been regularity of performance with consistent fuel savings of 41 per cent over previous types. Records indicate that 10 Texas type locomotives are responsible for a saving of at least \$10,000 a month in fuel alone.

Lawford Fry, metallurgical engineer, Standard Steel Works, emphasized the statement that gross ton-miles per train hour was a measure of the earning capacity of a railroad and that it all depended upon the steaming capacity of the locomotive and the efficiency of its cylinders. Two features now receiving consideration were higher boiler pressures and higher ratios of expansion, such as might be obtained by compound cylinders. Some advance data was given relating to tests of Baldwin locomotive 60,000, at Altoona. This locomotive of the 4-10-2 type is a three-cylinder compound with a double drum Brotan type firebox operating at 350 lb. The preliminary data indicate that 4,500 cylinder hp., can be developed with a combustion rate of 135 pounds of coal per square foot of grate per hour and that the cylinder water rate varies but slightly over a wide range of cylinder output.

Loop Brake Beam Suspension

THE Schaefer Equipment Company, Oliver Building, Pittsburgh, Pa., has recently developed the new brake beam suspension shown in the illustration for application to freight and passenger car trucks and locomotive tender trucks. In designing this type suspension especial consideration was given to the increasing use of trucks with cast steel side-frames, in that the hanger should be of such design as to protect the side-frame brake hanger bracket against the destructive downward wear encountered where a horizontal brake pin is used. In this loop-type hanger, instead of the old style open U-type or bottle-neck shaped hanger, a simple clevis is used to attach the hanger to the side frame. This is fastened into the side-frame bracket with a vertical pin thus entirely eliminating the horizontal pin fastened.

The clevis is entered into the side-frame through two rectangular slots which are cored in the side-frame bracket. A clevis support of this character has the advantage of a large contact surface in the side-frame bracket to receive the upward or downward thrusts of the hanger. It is also entirely independent of the side-frame so far as possible hanger wear is concerned and can be removed and turned upside down should the question of downward wear ever make this desirable. By utilizing a clevis of this construction the same amount of brake hanger contact is secured in the clevis at the side-frame as in the brake head.

While the clevis fastening is normally made to receive a vertical pin the idea has been advanced by railroad engineers that the clevis should be riveted to the side-frame and the manufacturer endorses this method of fastening.

The brake hanger is constructed to receive the maximum amount of material possible in the upper and lower cross-members which are in contact with the clevis and

brake head, and the two vertical legs of the hanger are normally made of $\frac{7}{8}$ -in. round section. This hanger is made by a patented process, eliminating the weld commonly introduced in a loop hanger. This method facilitates the use of 40 to 50-point carbon steel, with heat treatment to insure uniformity and maximum strength. The process is said also to permit the distribution of the metal in the cross-members to best advantage.

The clevis-connected hanger is entirely open at the point of contact with the side-frame thus enabling a



Schaefer Loop Type Brake Hanger with Clevis Support Applied to a Cast Steel Truck Side Frame

man to inspect this point of contact at a glance. It facilitates the permissible lateral motion of the brake beam without the introduction of bending strains, as the loop hangers may slide in the clevis instead of lifting off at one leg, which localizes all the load at one point of suspension.

The weight of a loop hanger is said to be about 20 per cent less than that of a U-type hanger of the same length and is nearly three times as strong in tension by actual tests.

* * * *



Eastbound "Golden State Limited" Leaving Tunnel, Juarez Mountains, New Mexico

70-Ton Hopper Cars for D. L. & W.

400 three-hopper steel cars built to replace 40-ton steel and wood coal carrying equipment

IN order to facilitate the handling of coal traffic, the Delaware, Lackawanna & Western recently retired about 400, 40-ton steel and wood coal cars and replaced them with modern 70-ton hopper-gondola cars which were built by the American Car & Foundry Company at its Berwick, Pa., plant. These new cars are the first of this capacity and type to be used by the Lackawanna. A great part of the coal handled by the Lackawanna is anthracite and in building these cars particular attention was directed to the construction of the car body and doors in such a manner as to eliminate, as far as possible, the loss of the small sizes of coal by sifting.

Increased loading capacity was obtained in this car by arranging the stakes on the inside of the side sheets instead of on the outside, as is the usual practice. There

entire length of the car, with a $\frac{1}{2}$ -in. by $12\frac{3}{4}$ -in. top cover plate. The ends of the channel are coped away to receive the buffer attachments together with a Union coupler centering device. There are seven pan-shaped $\frac{1}{4}$ -in. pressed fillers, and one saddle of $\frac{1}{4}$ -in. pressed steel located under each longitudinal ridge sheet. The body bolsters are built up of plate and angle construction. The bolster and side connection angles extend into the car. Diagonal braces of 5-in. by $3\frac{1}{2}$ -in. by $\frac{3}{8}$ -in. angle section are connected to the center sills and bolsters by $\frac{5}{8}$ -in. gusset plates.

Draft Gear and Trucks

The top side angle is a $\frac{5}{8}$ -in. by $3\frac{1}{2}$ -in. by $\frac{3}{8}$ -in. bulb angle running the entire length of the car. The bottom



70-Ton Three-Hopper Steel Car Built for the D. L. & W.

are 10 pressed steel stakes on each side of the car, two of which are secured to the center construction by means of deep gusset plates in order to prevent the bulging of the sides. The sides are further reinforced by four pressed steel cross ties placed at the top of the sides and properly spaced to give uniform stiffness. Three double hoppers are used which provide six extra large door openings with independently operated hopper doors to facilitate easy and rapid discharge of the lading. The details of the hoppers, such as the side and center hopper sheets, stiffeners, door spreaders and hopper doors, are standardized and interchangeable in order to minimize the number of parts required for repair work. The principal dimensions of the cars are shown in the accompanying table.

Details of Construction

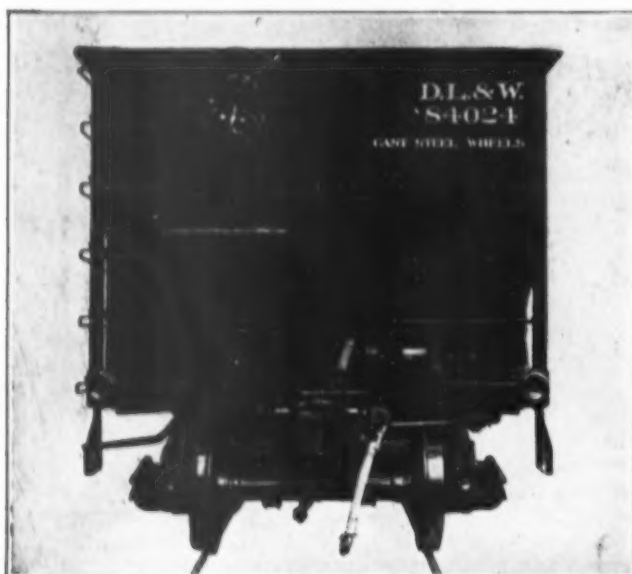
The under-frame is of the built-up type with two center sills composed of A. R. A. standard 12-in. special rolled channels, weighing 40.3 lb. per ft., extending the

flange angle at the sides is 5 in. by $3\frac{1}{2}$ in. by $\frac{3}{8}$ in. and extends from bolster to bolster. The side sheets are $\frac{1}{4}$ -in. plate, except that at the end panels they are $\frac{3}{8}$ -in. plate, pressed with an offset to accommodate the side ladders. The side sheets are all pressed inward at the top with ten $\frac{1}{4}$ -in. stiffeners on each side of the car. The sub side-sill is a 9-in., 17.5-lb. channel. The end sills are 9-in. 17.5-lb. channels with $3\frac{1}{2}$ -in. by $3\frac{1}{2}$ -in. by $\frac{5}{8}$ -in. angle connections to the center sills and top cover plate. The corner posts are $3\frac{1}{2}$ -in. by $3\frac{1}{2}$ -in. by $\frac{5}{8}$ -in. angle and the end posts are of 6-in., 8.2 lb. channel, except at the corner where the hand brake is located. The end post at this point consists of two 4-in., 8.2 lb. Z-bars arranged for the application of the Ajax handbrake. There are six hopper doors pressed from $\frac{1}{4}$ -in. plate, known as Ajax corrugated doors manufactured by the Union Metal Products Company. The six doors operate independently and are equipped with the Enterprise Railway Equipment Company's Type "D" door operating mechanism.

The cars are equipped with the Cardwell draft gear, type G. 111-AA, secured between Universal cast steel draft lugs. The couplers, furnished by the Gould Coupler Company, are A. R. A. type "D" with 6-in. by 8-in. shank and the regular A. R. A. butt suitable for either the single key, vertical yoke or double key horizontal yoke attachment. The draft keys used are of 6-in. by 1-in. by $\frac{1}{2}$ -in. carbon steel, quenched and tempered, with Universal draft key retainers. The side bearings are of the spring controlled anti-friction type manufactured by E. S. Woods & Company.

The car superstructure is mounted on Bettendorf four-wheel trucks. These trucks have cast steel side frames with journal boxes cast integral and are arranged for six truck springs at each side frame. Cast steel truck bolsters are used, with integral center plates and they are arranged for the Barber lateral motion device. The trucks are designed for 70 tons capacity and are equipped with double coil springs manufactured by the Crucible Steel Company. Davis 33-in. steel wheels, manufactured by American Steel Foundries, are mounted on 6-in. by 11-in. axles.

The cars are equipped with the National Car Equipment Company's Ajax hand brake which is designed to develop not less than 3,950 lb. pull at the brake cylinder



End View of the Car, Showing the Arrangement of the Hand Brake Equipment

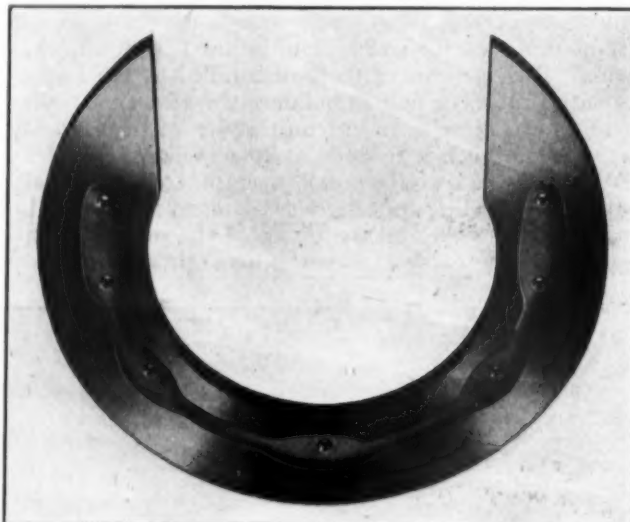
der push rod connection to the cylinder lever. The air brakes are Westinghouse automatic quick action, schedule K. D. 1012 with K-2 triple valve, centrifugal dirt collector, and double spring retaining valve, 10-20 type. A. R. A. No. 2 plus Creco trussed brake beams with which Creco four-point brake beam supports are employed.

PRINCIPAL DIMENSIONS OF D. L. & W. 70-TON CARS

Length over pulling face of couplers.....	43 ft. 11½ in.
Length over buffers.....	41 ft. 5 in.
Length inside, in the clear.....	40 ft. 0 in.
Width, over all.....	10 ft. 2¾ in.
Width, inside.....	10 ft. 1 in.
Height from top of rail to top of body.....	10 ft. 8 in.
Height from top of rail to hopper door opening.....	10¾ in.
Center to center of trucks.....	31 ft. 5 in.
Wheel base of trucks.....	5 ft. 8 in.
Capacity, level full.....	2,755 cu. ft.
Capacity, with 10-in. average heap.....	3,090 cu. ft.
Light weight.....	50,800 lb.

Self-Lubricating Lateral Plate for Driving Boxes

IN an effort to solve the problem of lateral wear on driving boxes, the More-Jones Brass & Metal Company, St. Louis, Mo., has developed a self-lubricating bronze lateral plate for driving boxes. It is cast close to the dimensions required which, it is claimed, allows the lateral plate to be applied at less than half the expense required in the present method of pouring the



The Lubrication is Fed to the Lateral Plate From a Grease Groove of the Driving Box Bearing

plate on the box. This practice usually requires an excess of metal, which is machined off. The renewal of the self-lubricating plate requires only the nicking of the welds and the wedging off of the plate, permitting the salvage of the material in a single piece.

The lubricant is fed to the face of the lateral plate from the first grease groove of the driving box bearing and therefore is automatically lubricated.

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On the L. & N. at Worthville, Ky.

General News Department

The Cleveland Railway Club will hold its next meeting on January 10. It will be the annual meeting.

The Railway Club of Greenville will hold its next meeting on January 27 at Greenville, Pa., when a paper will be read by General Manager, F. I. Synder, of the Bessemer & Lake Erie.

The New England Railroad Club will hold its next meeting on January 11, at the Copley Plaza Hotel when a paper will be read on "Motor Transportation" by H. F. Fritch, general traffic manager, of the Boston & Maine.

The Missouri Pacific, on December 11, presented to the Agricultural and Mechanical College of Texas a locomotive, for use in the engineering department of the college. This locomotive is No. 110, of the International-Great Northern, and was built in 1890.

The Missouri-Kansas-Texas has granted an increase in wages of two cents an hour to locomotive and car shop and enginehouse employees, the two-cent advance applying generally with the exception of two or three minor classes to which only a one-cent increase was applied. The increase is effective January 1, 1927.

The Southern Pacific has granted shop mechanics, helpers, apprentices and coach cleaners increases in wages amounting to one cent an hour. The new rate for mechanics in the metal crafts and passenger car departments is 76 cents an hour; for car inspectors and freight car builders 67 cents an hour; for helper 48 cents to 51 cents an hour; for coach cleaners 38 cents to 41 cents an hour; and for apprentices 28 cents to 53 cents an hour.

Hearings on the petition of the bondholders' defense committee to delay the confirmation of the sale and reorganization plan of the Chicago, Milwaukee & St. Paul, were begun at Chicago on December 13, before Federal Judge James H. Wilkerson in the United States District Court. During the first three days representatives of the bondholders testified to show why no action should be taken on the motion of the purchasers for a confirmation of the sale.

The Interstate Commerce Commission on December 21 announced it had granted further extensions of time to six railroads in which to complete the installations of automatic train control as required by the commission's second order. Extensions to July 1 were allowed in the case of the Chicago & North Western, the Chicago, Indianapolis & Louisville, the Reading, the Central of New Jersey and the Long Island, while the Atlantic Coast Line was allowed to April 30. The extension for the Long Island also applies to the installation required under the commission's first order.

Senator Hawes, of Missouri, has introduced in the Senate as S. 4842 a bill similar to bills he had previously introduced in the House, before he became a Senator, to provide for the creation of seven regional commissions to co-operate with and assist the Interstate Commerce Commission in the performance of its duties. It provides that complaints shall be initially filed with the Interstate Commerce Commission at Washington, and then either handled by it or assigned to one or more of the divisional commissions; and provision is made for appeals from the decisions of the divisional commissions to the Interstate Commerce Commission.

The Brotherhood of Sleeping Car Porters has asked the United States Railway Mediation Board to hear its plea for an increase in wages and the abolition of tipping. The porters ask for a minimum wage of \$150 a month, in place of \$72.50, which is the present minimum; and they want a maximum of 240 hours service a month. Before hearing the

case, the mediation board will determine whether this brotherhood or the spokesman for the Pullman employees representation plan rightfully represents the porters in wage matters. The present railway labor law empowers the board to hear any organization which can be shown to command a majority of the employees.

Machine Work in Snow Clearing

At Williamsport, Pa., on the occasion of the snowstorm of December 5, and at certain other places on the Central Pennsylvania division of the Pennsylvania, the station platforms were cleared by the use of ditchers. Many days' time of hand shovelers were saved. Fifteen locomotives of the Central Pennsylvania division have been equipped with snow blowers, and these also did valuable service in the storm referred to. They were used to clean switches and for much other clearing work, releasing large numbers of laborers.

Wage Request on Southern Roads

Negotiations for an increase in wages for conductors and trainmen on the southern roads have been in progress for several days in Washington. L. E. Sheppard, president of the Order of Railway Conductors, and W. N. Doak, vice-president of the Brotherhood of Railroad Trainmen, presented to the railroad representatives as a basis for the negotiations the recent award of the board of arbitration in the eastern case, which provided for an increase of 7½ per cent, and the representatives of the carriers countered with a request for a modification of a number of rules. Failing to agree the Board of Mediation was asked to offer its services and members of the board have been conferring with representatives of the employees and of the roads.

Three Hundred Kegs of Powder in a Train Wreck

The derailment of an eastbound freight train on the Central New England, near Towners, N. Y., on December 19, was followed by a fire, which lasted two hours, and in spite of heroic efforts to prevent the spread of the flames, a carload of powder was ignited, and exploded, with injuries to 18 persons. Among the injured was H. A. Christinger, trainmaster. Several other casualties were pronounced serious, some of the victims being occupants of houses in the vicinity. Three dwellings were wrecked. On a large tract of woods, the trees were stripped of branches and bark. Buckets, used to carry both water and snow, were the only means at hand to check the flames. Twenty-three cars altogether ran off the track. The derailment occurred about 11 a. m. and no explanation has been given either of the derailment or the fire.

Business Paper Publisher Honored

Over 1,000 friends gathered at a testimonial dinner at the Hotel Astor on December 17, commemorating the 41 years as a business and trade paper publisher of James H. McGraw, president of the McGraw-Hill Publishing Company, Inc. The committee which sponsored the dinner was headed by Arthur Williams, vice-president of the New York Edison Company. John W. Lieb, vice-president and general manager of the New York Edison Company, was toastmaster.

Gen. Guy E. Tripp, chairman of the board of the Westinghouse Electric & Manufacturing Company, spoke as a representative of the electrical manufacturing industry; Willits B. Sawyer, president of the American Electric Railway Association, as a representative of that industry; Charles L. Edgar, president of the Edison Electric Illuminating Company of Boston, for the power industry; Dean Dexter S. Kimball, of the Cornell University School of Engineering, and president of the

(Continued on page 1278)

Freight Operating Statistics of Large Steam Roads—Selected Items for Oct., 1926,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles		Car-miles		Ton-miles (thousands)		Average number of locomotives on line daily				
			Principal and helper	Light	Loaded (thousands)	Per cent loaded	Gross, Excluding locomotive and tender	Net, Revenue and non-revenue	Servicable	Un-servicable	Per cent unservicable	Stored	
New England Region:													
Boston & Albany.....1926	407	244,172	267,080	32,469	5,763	69.7	294,477	117,814	103	17	14.1	5	
.....1925	404	247,074	274,659	37,299	5,524	71.4	275,471	108,097	116	18	13.1	3	
Boston & Maine.....1926	2,143	518,192	598,648	53,025	14,880	71.8	752,161	313,520	297	88	22.9	35	
.....1925	2,253	528,316	615,929	56,977	14,255	73.5	689,501	278,172	335	99	22.8	50	
N. Y., New H. & Hart.....1926	1,892	531,959	558,394	40,661	15,854	71.6	810,078	351,836	280	57	16.9	21	
.....1925	1,892	492,403	515,988	38,843	14,572	72.2	703,952	285,849	298	44	12.9	39	
Great Lake Region:													
Delaware & Hudson.....1926	875	402,669	546,960	59,578	12,187	68.0	764,842	395,013	252	36	12.5	67	
.....1925	875	301,153	416,608	51,905	8,702	70.8	504,908	250,750	260	39	13.1	120	
Del., Lack. & Western.....1926	999	626,755	726,877	92,008	21,432	71.4	1,199,595	544,404	272	51	15.7	15	
.....1925	993	587,303	662,168	77,501	18,372	70.3	969,301	391,499	296	58	16.4	67	
Erie (inc. Chic. & Erie).....1926	2,323	1,174,683	1,297,189	154,165	45,651	67.0	2,702,044	1,179,637	546	116	17.5	66	
.....1925	2,325	1,087,835	1,189,822	128,610	40,451	62.2	2,385,894	915,602	599	95	13.7	179	
Lehigh Valley.....1926	1,345	660,803	731,227	86,454	21,610	66.5	1,277,763	587,685	400	78	16.3	51	
.....1925	1,246	603,008	663,259	109,902	19,606	68.9	1,097,981	484,974	416	91	18.0	118	
Michigan Central.....1926	1,835	609,583	626,552	23,514	19,939	63.6	1,137,630	436,583	242	45	15.7	51	
.....1925	1,826	584,734	600,628	18,063	20,716	67.9	1,063,224	398,778	299	46	13.3	107	
New York Central.....1926	6,482	2,252,929	2,565,048	178,492	88,952	63.9	5,352,400	2,343,009	1,140	276	19.5	235	
.....1925	6,478	2,362,537	2,664,097	196,585	88,664	63.7	5,331,847	2,316,883	1,154	359	23.7	207	
New York, Chic. & St. L.....1926	1,665	675,208	680,170	7,385	22,931	70.3	1,204,152	483,371	238	54	18.6	42	
.....1925	1,669	720,340	728,893	9,051	23,115	68.6	1,219,932	478,427	229	73	24.2	31	
Pere Marquette.....1926	2,179	511,769	522,302	9,202	13,165	66.4	749,679	325,068	189	30	13.6	7	
.....1925	2,198	469,472	479,607	7,441	12,362	67.7	698,317	325,752	192	21	10.0	10	
Pitts. & Lake Erie.....1926	231	147,667	148,820	1,719	5,333	65.2	422,315	247,133	65	17	20.3	17	
.....1925	231	134,401	137,924	1,869	4,565	64.4	345,812	199,983	71	13	15.5	33	
Wabash.....1926	2,497	798,985	833,814	14,177	26,100	71.8	1,409,982	608,549	330	52	13.6	39	
.....1925	2,497	787,666	822,243	16,518	25,198	72.3	1,331,333	558,275	330	51	13.3	51	
Central Eastern Region:													
Baltimore & Ohio.....1926	5,197	2,224,458	2,573,549	230,576	67,425	63.7	4,404,024	2,141,375	1,077	163	13.1	39	
.....1925	5,196	2,138,264	2,519,111	202,206	64,704	65.6	4,170,239	2,056,848	1,007	259	20.5	23	
Central of New Jersey.....1926	691	291,884	319,760	35,516	8,871	61.4	579,486	286,321	210	52	19.9	32	
.....1925	691	269,733	298,398	40,338	6,969	64.7	411,320	192,880	238	36	13.1	61	
Chicago & Eastern Ill.....1926	945	292,495	293,922	3,583	8,701	64.7	536,236	258,438	127	41	24.3	38	
.....1925	945	267,291	268,025	4,522	7,983	66.5	473,641	231,724	139	27	16.1	52	
Cleve., Cin., Chic. & St. L.....1926	2,374	805,791	845,876	24,055	26,495	62.5	1,711,701	816,361	351	86	19.6	42	
.....1925	2,381	781,757	822,936	28,774	25,398	64.5	1,602,435	772,862	328	92	21.8	20	
Elgin, Joliet & Eastern.....1926	460	136,442	144,714	5,845	4,110	65.6	310,986	164,938	76	15	16.6	1	
.....1925	460	124,606	132,357	5,479	3,931	67.5	286,151	153,573	69	18	21.1	...	
Long Island.....1926	393	50,739	56,284	15,199	7,777	57.6	49,445	19,470	48	12	20.5	...	
.....1925	392	48,091	52,432	13,115	6,661	59.6	40,257	15,316	43	8	15.3	1	
Pennsylvania System.....1926	10,882	5,324,437	5,823,552	455,220	162,757	65.3	10,739,955	5,208,714	2,822	431	13.2	238	
.....1925	10,872	4,905,123	5,320,652	408,212	146,066	65.8	9,425,454	4,518,241	2,720	646	19.2	228	
Reading.....1926	1,129	700,378	769,754	79,235	19,224	64.5	1,369,790	727,417	346	60	14.8	47	
.....1925	1,132	627,233	689,622	70,908	17,232	62.8	1,140,213	577,617	389	86	18.1	142	
Pocahontas Region:													
Chesapeake & Ohio.....1926	2,651	1,349,388	1,431,933	52,579	46,220	57.0	3,754,338	2,067,095	537	104	16.2	15	
.....1925	2,627	1,263,174	1,327,819	45,378	41,130	58.5	3,177,233	1,737,717	484	106	17.9	6	
Norfolk & Western.....1926	2,231	1,004,953	1,235,743	54,536	37,296	60.8	3,101,908	1,731,931	562	56	9.0	87	
.....1925	2,231	948,647	1,155,901	40,023	32,281	61.3	2,624,319	1,433,858	585	52	8.2	124	
Southern Region:													
Atlantic Coast Line.....1926	4,931	745,332	757,782	12,630	20,218	64.4	1,123,903	456,281	451	39	8.0	91	
.....1925	4,900	880,395	912,303	15,572	22,474	64.4	1,235,502	494,502	385	59	13.3	21	
Central of Georgia.....1926	1,905	344,039	348,056	7,584	8,694	72.0	470,864	214,635	154	18	10.6	3	
.....1925	1,907	388,231	391,524	9,132	8,635	70.9	464,716	210,401	147	17	10.2	10	
I. C. (inc. Y. & M. V.).....1926	6,555	2,140,397	2,154,245	51,349	62,127	65.7	3,872,982	1,725,597	751	106	12.4	2	
.....1925	6,555	2,118,947	2,139,355	40,504	61,044	67.0	3,683,286	1,642,614	767	104	11.9	15	
Louisville & Nashville.....1926	5,021	1,845,776	1,935,124	59,412	38,704	62.5	2,616,918	1,299,387	619	106	14.7	19	
.....1925	5,027	1,955,650	2,090,156	63,652	38,626	62.6	2,549,038	1,245,003	614	101	14.1	3	
Seaboard Air Line.....1926	3,904	571,321	588,141	8,792	15,294	66.1	870,209	371,415	253	40	13.6	17	
.....1925	3,767	596,569	616,548	16,883	15,382	67.8	827,611	339,509	242	21	8.0	...	
Southern Railway System.....1926	8,050	2,121,234	2,160,546	40,171	55,199	69.1	2,994,926	1,271,525	1,102	161	12.7	56	
.....1925	8,157	2,189,223	2,249,463	43,119	55,198	70.4	2,925,478	1,231,731	1,046	163	13.5	63	
Northwestern Region:													
Chic. & North Western.....1926	8,459	1,735,614	1,795,014	25,775	46,782	63.5	2,673,633	1,099,369	758	153	16.8	92	
.....1925	8,469	1,784,386	1,843,587	28,579	44,707	62.2	2,621,540	1,081,144	745	202	21.3	66	
Chic., Milw. & St. P.....1926	11,175	1,849,397	1,967,846	112,254	57,092	66.3	3,254,424	1,428,366	845	161	16.0	127	
.....1925	11,201	1,829,574	1,965,417	99,974	55,770	67.1	3,100,782	1,343,399	910	195	17.6	94	
Chic., St. P., Minn. & Om.....1926	1,724	347,716	377,176	16,229	7,531	68.7	404,879	170,514	159	29	15.3	2	
.....1925	1,819	356,853	383,818	15,681	7,509	69.5	399,820	167,947	166	36	17.9	2	
Great Northern.....1926	8,182	1,320,663	1,368,344	77,623	49,356	63.0	3,109,505	1,386,996	607	100	14.1	62	
.....1925	8,232	1,210,323	1,254,592	61,070	42,515	65.9	2,519,258	1,119,305	639	114	15.2	57	
M., St. P. & S. Ste. M.....1926	4,372	591,482	610,040	5,971	15,735	71.1	832,860	386,295	310	20	6.0	19	
.....1925	4,372	651,714	671,325	9,445	16,665	73.0	858,856	406,046	308	34	10.1	13	
Northern Pacific.....1926	6,510	1,037,193	1,098,252	60,329	35,563	69.7	1,960,213	851,127	514	126	19.7	53	
.....1925	6,514	1,078,311	1,133,671	60,973	34,146	69.0	1,924,803	843,940	524	132	20.1	49	
Oreg.-Wash. R. R. & Nav.....1926	2,161	247,200	264,716	24,033	7,671	70.0	451,327	201,898	142	20	12.3	7	
.....1925	2,185	227,173	247,313	27,278	6,744	71.7	378,833	171,696	139	23	14.0	2	
Central Western Region:													
Atch., Top. & S. Fe.....1926	10,275	2,233,908	2,461,135	152,560	75,707	65.3	4,459,102	1,582,396	843	148	14.9	76	
.....1925	10,045	2,361,518	2,607,006	182,172	79,206	62.7	4,725,931	1,538,122					

Compared with Oct., 1925 for Roads with Annual Operating Revenues above \$25,000,000.

Region, road and year	Average number of freight cars on line daily			Per cent un-servicable	Gross ton-miles per train-hour, excluding locomotive and tender	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per loaded car	Net ton-miles per car-day	Car miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles including locomotive and tender	Locomotive miles per locomotive day
	Home	Foreign	Total										
New England Region:													
Boston & Albany.....1926	1,950	5,623	7,573	3.0	14,788	1,206	483	20.4	502	35.2	9,340	178	80.7
1925	2,110	6,689	8,799	2.5	14,083	1,115	438	19.6	396	28.4	8,628	194	75.4
Boston & Maine.....1926	11,239	17,896	29,135	7.2	15,113	1,452	605	21.1	347	22.9	4,719	127	54.5
1925	12,119	15,702	27,821	9.6	13,980	1,305	527	19.5	322	22.5	3,983	143	50.0
N. Y., New H. & Hart.....1926	17,391	24,912	42,303	17.5	17,530	1,523	661	22.2	268	16.9	5,999	122	57.3
1925	18,764	22,505	41,269	18.1	15,286	1,430	581	19.6	223	15.8	4,874	132	52.4
Great Lake Region:													
Delaware & Hudson.....1926	7,078	7,980	15,058	4.7	22,418	1,899	981	32.4	846	38.4	14,559	148	67.9
1925	11,733	5,989	17,722	5.2	20,994	1,677	833	28.8	456	22.4	9,242	170	50.4
Del., Lack. & Western...1926	12,888	11,875	24,763	4.2	22,201	1,914	869	25.4	709	39.1	17,574	140	82.0
1925	16,606	10,136	26,742	3.0	20,490	1,650	667	21.3	472	31.5	12,724	164	67.3
Erie (inc. Chic. & Erie)...1926	29,710	26,943	56,653	7.6	26,630	2,300	1,004	25.8	672	38.8	16,382	126	70.7
1925	33,441	23,016	56,457	7.5	25,719	2,193	842	22.6	523	37.1	12,701	127	61.3
Lehigh Valley1926	19,738	12,807	32,545	7.0	25,146	1,934	889	27.2	583	32.2	14,090	145	55.3
1925	21,132	10,465	31,597	6.9	24,924	1,821	804	24.7	495	29.1	11,626	144	49.2
Michigan Central1926	12,622	18,583	31,205	5.0	25,948	1,866	716	21.9	451	32.4	7,675	113	73.1
1925	12,573	19,473	32,046	4.8	24,844	1,818	652	19.3	401	30.7	7,045	117	58.0
New York Central.....1926	53,796	81,184	134,980	3.3	27,328	2,376	1,040	26.3	566	33.3	11,660	113	62.5
1925	54,084	76,976	131,060	4.4	25,764	2,257	981	26.1	570	34.3	11,538	119	61.0
New York, Chic. & St. L...1926	9,409	12,397	21,806	6.3	23,773	1,783	716	21.1	715	48.3	9,365	108	75.8
1925	9,158	12,291	21,449	5.4	21,833	1,694	664	20.7	720	50.6	9,249	119	78.7
Pere Marquette1926	8,104	12,684	20,788	3.6	16,691	1,465	635	24.7	504	20.8	4,813	111	78.4
1925	7,456	12,640	20,096	4.0	15,973	1,487	694	26.4	523	29.3	4,780	112	73.8
Pitts. & Lake Erie.....1926	8,478	10,201	18,679	4.1	28,809	2,860	1,674	44.7	427	14.7	34,442	107	59.5
1925	11,562	7,566	19,468	7.4	26,352	2,573	1,488	43.8	331	11.7	27,871	75	53.7
Wabash1926	12,816	15,425	28,241	2.7	25,000	1,765	762	23.3	695	41.5	7,862	152	71.7
1925	11,853	13,539	25,392	2.7	23,149	1,690	769	22.2	709	44.3	7,212	135	71.1
Central Eastern Region:													
Baltimore & Ohio.....1926	61,841	43,239	105,080	3.6	19,514	1,980	963	31.8	657	32.5	13,291	161	72.9
1925	65,632	48,091	113,723	7.2	18,753	1,950	962	31.8	583	28.0	12,769	168	69.3
Central of New Jersey...1926	14,782	13,466	28,248	5.0	18,185	1,985	981	32.3	327	16.5	13,368	152	43.8
1925	16,818	11,899	28,717	3.3	13,724	1,525	715	27.7	217	12.1	9,006	180	39.8
Chicago & Eastern Ill....1926	11,475	5,493	16,968	25.8	23,361	1,833	864	29.7	491	25.6	8,821	130	57.3
1925	12,107	5,021	17,128	21.4	22,853	1,772	867	29.0	436	22.6	7,909	137	53.1
Cleve., Cin., Chic. & St. L.1926	13,329	22,445	35,774	5.3	26,143	2,124	1,013	30.8	736	38.2	11,062	117	64.3
1925	13,546	21,350	34,896	4.9	23,669	2,050	989	30.4	714	36.4	10,472	125	65.4
Elgin, Joliet & Eastern...1926	9,163	5,629	14,792	4.6	15,280	2,279	1,209	40.1	360	13.7	11,566	127	53.4
1925	9,112	7,302	16,414	6.7	15,687	2,296	1,232	39.1	302	11.4	10,774	134	51.1
Long Island1926	1,802	7,654	9,456	0.8	5,049	974	384	25.1	66	4.6	1,597	314	38.4
1925	1,845	5,667	7,512	0.9	5,025	837	318	23.2	66	4.8	1,256	260	42.0
Pennsylvania System1926	191,388	101,788	293,176	7.8	20,544	2,017	978	32.0	573	27.4	15,439	129	62.3
1925	196,932	94,947	291,879	10.1	19,825	1,922	921	30.9	499	24.5	13,406	132	54.9
Reading1926	19,035	19,814	38,849	2.8	20,330	1,956	1,039	36.5	604	25.7	20,782	150	67.4
1925	21,021	17,975	38,996	2.4	20,300	1,818	921	33.5	478	22.7	16,465	151	51.7
Pocahontas Region:													
Chesapeake & Ohio.....1926	29,780	13,800	43,580	2.7	28,902	2,782	1,532	44.7	1,530	60.0	25,155	94	74.7
1925	27,375	13,337	40,712	3.6	24,360	2,516	1,376	42.2	1,377	55.6	21,336	108	75.0
Norfolk & Western.....1926	30,766	12,593	43,699	1.3	37,497	3,087	1,723	46.4	1,278	45.3	25,038	134	67.4
1925	26,842	10,543	37,385	1.8	33,726	2,766	1,511	44.4	1,237	45.4	20,729	143	60.5
Southern Region:													
Atlantic Coast Line.....1926	20,097	13,766	33,863	10.4	18,117	1,508	612	22.6	435	29.9	2,985	116	50.7
1925	19,610	22,786	42,396	3.4	14,749	1,403	562	22.0	376	26.5	3,255	129	67.3
Central of Georgia.....1926	4,013	7,146	11,159	6.2	18,179	1,369	624	24.7	620	34.9	3,635	146	66.7
1925	3,996	8,717	12,713	4.6	15,485	1,197	542	24.4	534	30.9	3,559	156	78.8
I. C. (inc. Y. & M. V.)...1926	35,603	34,618	70,221	3.2	22,465	1,809	806	27.8	793	43.5	8,492	128	83.0
1925	37,748	32,483	70,231	3.6	21,033	1,738	775	26.9	754	41.8	8,084	132	80.8
Louisville & Nashville...1926	39,473	20,225	59,698	12.7	16,678	1,415	764	33.6	702	33.4	8,348	150	88.8
1925	37,414	23,843	61,257	13.1	14,582	1,303	637	32.2	656	32.5	7,989	163	97.3
Seaboard Air Line.....1926	12,213	11,374	23,587	3.0	17,577	1,523	650	24.3	508	31.6	3,069	131	65.8
1925	10,706	15,837	26,543	1.7	14,539	1,387	569	22.1	412	27.5	2,907	146	77.7
Southern Railway System.1926	49,927	31,813	81,740	5.2	18,252	1,412	599	23.0	502	31.5	5,095	152	56.2
1925	49,267	38,333	87,540	4.8	16,495	1,336	563	22.3	454	28.9	4,871	158	61.2
Northwestern Region:													
Chic. & North Western...1926	45,294	34,473	79,767	6.7	19,324	1,540	633	23.5	445	29.8	4,192	130	64.5
1925	46,122	31,757	77,879	9.3	18,456	1,469	606	24.2	447	29.7	4,122	138	63.9
Chic., Milw. & St. P....1926	51,348	29,331	80,679	5.4	21,607	1,760	772	25.0	571	34.4	4,123	132	66.7
1925	54,981	27,976	82,957	5.5	20,406	1,695	734	24.1	522	32.3	3,869	145	60.3
Chic., St. P., Minn. & Om.1926	4,476	10,938	15,414	15.7	14,729	1,164	490	22.6	357	22.9	3,191	133	67.6
1925	2,927	9,080	12,007	10.1	13,460	1,120	471	22.4	451	29.0	2,979	153	63.7
Great Northern1926	41,878	21,231	63,109	4.5	27,058	2,355	1,050	28.1	709	40.1	5,468	120	66.0
1925	45,800	20,423	66,223	5.8	23,814	2,081	925	26.3	545	31.4	4,386	133	56.3
M., St. P. & S. Ste. M....1926	20,958	6,764	26,822	4.1	16,560	1,408	633	24.6	465	26.6	2,850	108	60.2
1925	19,710	8,447	28,157	3.6	15,420	1,318	623	24.4	465	26.1	2,996	116	64.2
Northern Pacific1926	34,039	10,716	44,755	5.7	23,717	1,890	821	23.9	613	36.8	4,217	137	58.5
1925	33,629	11,487	45,116	6.0	21,924	1,785	783	24.7	603	35.4	4,179	142	58.8
Oreg.-Wash. R. R. & Nav.1926	7,613	4,768	12,381	3.6	21,459	1,826	817	26.3	526	28.6	3,014	171	57.4
1925	7,174	4,407	11,581	3.7	19,051	1,668	756	25.5	478	26.2	2,534	183	54.7
Central Western Region:													
Atch., Top. & S. Fe 1926	49,721	24,215	73,936	4.4	27,287	1,996	708	20.9	690	50.6	4,968	112	85.1
(incl. P. & S. F.).....1925	51,354	19,502	71,356	4.8	27,308	2,001	651	19.4	695	57.1	4,940	121	90.3
Chicago & Alton.....1926	8,435	6,009	14,444	6.2	18,123								

General News Department

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American Engineering Council, on behalf of engineering, and Edward J. Mehren, vice-president of the McGraw-Hill Company, and editorial director of that organization, as a representative of Mr. McGraw's associates.

Mr. McGraw responded with a few well-chosen remarks, closing with the statement that: "To work with you and the thousands of your fellows whom you represent tonight has been a source of constant inspiration. To serve you, to help you in your developments in engineering and industry has been an estimable privilege."

New York Merchants' Association Opposed to Territorial Commerce Commission

R. S. Stubbs, chairman of the committee on transportation, speaking for the Merchants' Association of New York City, expresses decided disapproval of the proposal to divide the Interstate Commerce Commission into regional boards, and of any or all proposals to weaken or modify the centralized authority now exercised by the commission. Mr. Stubbs' statement says:

"The Merchants' Association is keenly alive to the necessity for speeding up the decisions of the Interstate Commerce Commission, but the association believes that this can be accomplished more effectively by relieving the commission of some of its duties, such as boiler inspection, signal installation, signal appliance regulation and the like, leaving to it those duties which relate largely to the regulation of rates, proper returns to the carriers, issues of securities, and consolidations.

"The chief difficulty at present is the inability of the commission to secure competent examiners and hold them at the meager salary it is allowed to pay. Many of the best examiners have left the commission to practice on their own account. Obviously the remedy is a proper appropriation to secure the calibre of talent this work requires and to hold it.

"The chief argument advanced by those who favor the regional plan is that this will bring the commission to the people instead of compelling complainants to go to Washington; but those who advance this argument seem to overlook the fact that unless there were some appeal to a central body there would be all kinds of decisions on the same point. It is probable, therefore, that the plan would result in sectional decisions instead of national decisions as at present. In fact, it would bring about a situation much like the one that we had before the Shreveport decision when each state made rates to foster local enterprises, irrespective of the effect on neighboring communities."

New Consolidation Bill Introduced in Senate

Apparently by way of affording the Senate a substitute for the Cummins railroad consolidation bill, Senator Fess, of Ohio, on December 17 introduced in the Senate a bill, S. 4892, to provide for voluntary consolidations, subject to the approval of the Interstate Commerce Commission, which is identical with the bill introduced in the House by Representative Parker, now pending before the House committee in interstate and foreign commerce, except for some detail amendments suggested at the hearings on the latter bill last Spring. The bill omits the requirement of the present law that the commission prepare a complete consolidation plan and would require the commission after seven years to report to Congress the extent to which unifications have taken place, with its recommendations as to further proceedings.

The changes from the form of the Parker bill affect such details as those concerning the consent of security-holders and similar matters, and after giving the commission power to prescribe the terms and conditions on which a carrier may be made a party to a proposed unification says: "In reaching any opinion or in making any determination in respect of the public interest, the commission shall not consider or pass upon the terms offered the holders of voting securities of the carriers filing, or joining in the filing of, the petition."

It is understood that similar amendments will be offered to the House bill and that an effort will be made to have the Senate committee on interstate commerce report out the Fess bill so as to give it a status equal to that of the Cummins bill on the Senate calendar.

Crossing Stop Law Ignored

I. B. Tigrett, president of the Gulf, Mobile & Northern, in an appeal to all good citizens, and especially to officers of the law, to do everything possible toward preventing disasters at grade crossings, says that a check of automobiles crossing the main line of that road recently at a town in Mississippi, showed 611 automobiles crossing, during the time checked, of which only one was brought to a stop. On three others, the drivers checked their speed and apparently looked. The other 607 did not hesitate. There is now a law in Mississippi requiring automobiles to be stopped before passing over a railroad, and a stop sign is prescribed. Presumably there was one of these signs at the crossing referred to, although Mr. Tigrett's appeal has nothing to say on this point. He says that the enginemen of the road are under a constant strain, which in some cases has proved detrimental to the men's health, and some of the runners have contemplated quitting their jobs. Within a few days, this month, there were three cases on this road where enginemen had to stop their trains and assist in pushing stalled automobiles off the tracks.

New York Railroad Club Dinner

The annual dinner of the New York Railroad Club was held at the Hotel Commodore on Thursday evening, December 16. Unfortunately, the accommodations at the hotel were inadequate for this event, which has been growing larger and larger each year. Since only 3,058 places could be provided, it was necessary to return several hundred checks which accompanied requests for reservations on the part of late comers.

The dinner committee was headed by J. S. Doyle, assistant to the general manager of the Interborough Rapid Transit Company, with Col. Charles Hine as vice-chairman. The newly elected president, W. G. Gove, superintendent of equipment, Brooklyn-Manhattan Transit Lines, officiated as toastmaster. Music during the dinner was furnished by the New Haven Railroad Orchestra. W. F. Jones, general storekeeper of the New York Central, the retiring president of the club, was presented with a token of esteem on the part of the club members, the presentation being made by Frank Hedley, president of the Interborough Rapid Transit Company.

After the service of the dinner a raised platform in the large ballroom became the center of attraction. A special railroad grand opera number was presented through the courtesy of the New York, New Haven & Hartford Railroad by Signors Charles Kullman and Marshall Burwell, accompanied by Miss Signe Nordin. Stunts were enacted by Nick Altmock and Al Schacht, all-American athletic humorists.

During an amateur boxing carnival, in which E. L. Smith of the Scientific Production Corporation acted as announcer, and Dan Hickey as referee, Gene Tunney arrived and was given a rousing reception, the President's Prize Porters Quartet of the Pullman Company announcing his arrival by the singing of "Over There." Mr. Tunney made a short address in which he commented particularly upon clean sport and the responsibility which he felt toward boys and young men of this country.

Officers' Salaries Questioned Before I. C. C.

Oral argument was heard by the Interstate Commerce Commission on December 17 in the case involving the ascertainment of the net railway operating income and valuation of the St. Louis & O'Fallon and the Manufacturers' railways, for recapture purposes, which had been re-opened for the purpose of inquiring into increases in the compensation of William Cotter, president, and A. Busch, chairman of the board, of the two companies, made in 1923, and also as to whether the company was receiving sufficient revenue from the operation of a special miners' train.

Attorneys for the commission's Bureau of Valuation, P. J. Dougherty and R. E. Freer, argued that the increase in the salary of Mr. Busch from \$2,400 to \$18,000, and a special payment of \$25,000 to Mr. Cotter voted by the board of directors, were unreasonable and operated to reduce the amount of excess income, and that the commission should require that the amounts be written out of the operating expenses and charged to the stockholders. They also contended that the O'Fallon should receive \$1,000 a month instead of \$300 a month for the operation of the train which carries miners to and from a coal mine controlled by the Busch estate, which also controls the railroads. Edgar E. Clark, representing the two railroads, said that the

payments had been voted in recognition of services which had increased the revenues of the roads, but that his clients were more concerned about the implied charge that they had dishonestly converted moneys of the companies to their own use than they were as to how the amounts should be charged, and that not the slightest evidence had been produced against the bona fides of the transactions. He also criticized the tactics of the representatives of the Bureau in comparing the salaries with those of other short line railroads on simply a mileage basis and in questioning the officers as to what they did to earn their money on the basis of the time devoted.

Commissioner Cox asked whether it was contended that it was illegal to pay a considerable sum for advice, even though no labor were involved, that might save the expenditure of a larger amount for labor. Mr. Freer and Mr. Dougherty replied that the officers had done nothing more than perform their regular duties.

Rivers and Harbors Bill Passed by Senate

The Senate on December 21 passed the rivers and harbors bill after Senator Gooding's proposed amendment to the long-and-short-haul clause of the commerce act, which he proposed to offer as rider, had been debated and then withdrawn, and after a similar amendment had been offered and then withdrawn by Senator Pittman.

The bill as passed carries appropriations amounting to approximately \$70,000,000, including some changes from the House bill which was passed at the last session. The Senate bill includes an item authorizing the expenditure of \$3,500,000 to provide a channel in the Illinois river, as part of the lakes-to-the-gulf waterway, 9 feet in depth and 200 feet in width. The Senate also adopted a provision for the expenditure of \$12,000,000 as a start, for the improvement of the Missouri river between Kansas City and Sioux City with a view to securing a permanent navigable channel 6 feet in depth, and a provision for the purchase of the Cape Cod Canal by the federal government for \$11,500,000.

On December 20 Senator Gooding announced his intention of offering as an amendment his long-and-short-haul bill, which had previously failed to pass the Senate as a separate bill, and made a long speech on it. On the following day Senator Pittman offered an amendment in a more simple form, providing that "the Interstate Commerce Commission shall not have authority to relieve common carriers from the operation of section 4 of the interstate commerce act on account of actual or potential water competition from transportation through the Cape Cod Canal or the Panama Canal," but after some debate withdrew it, saying he would try it later as a separate measure.

Proposals for the development of the Missouri river from Kansas City to Omaha for navigation were characterized as contemplating a "doubtful business venture" at this time, in a report submitted to the Secretary of War by Major General Edgar Jadwin, chief of engineers, which was read during the debate. In place of previous recommendations for a channel 6 feet deep and 200 feet wide, at an estimated cost of approximately \$28,000,000, General Jadwin recommended the use of possibly \$6,000,000 of federal funds and local co-operation to the extent of \$4,000,000 for the protection of banks and stabilization of channels, which would be of benefit later in case of the adoption of a more comprehensive program. "The economic situation will become much clearer and more definite in a few years," the report says, "especially when the section below Kansas City shall have been improved . . ."

During Senator Pittman's speech Senator Bruce remarked that "time was when, if a legislative measure were knocked in the head, it would gasp and give up the ghost. But that time seems to have passed. The amendment of the Senator from Nevada is simply an attempt to revive the amendment of the long-and-short-haul provision of the interstate commerce act which has now twice, to my knowledge, received the disapproval of Congress." Senator Pittman replied that the bill had once passed the Senate by a 2 to 1 vote but that it was defeated the last time by a 2 to 1 vote. "Yes," said Senator Bruce. "That was because the appeal from Philip drunk to Philip sober was effectively made. Congress reached the one conclusion when it was in a state of more or less ignorance of the subject. It reached the other when it was thoroughly enlightened by exhaustive discussion."

Traffic News

The meeting of the Great Lakes Regional Advisory Board, scheduled for January 5, 1927, at Toledo, Ohio, has been postponed to January 26.

S. W. Ewers has been appointed freight claim agent of the Great Lakes Transit Corporation (Buffalo, N. Y.) in place of J. F. Treble, deceased.

The Women's Traffic Club of Los Angeles, Cal., held its regular meeting on December 8. Miss Hausen, past president, reported on the recent Milwaukee convention of the Associated Traffic Clubs of America, at which she was the only woman delegate.

The Minneapolis Traffic Club has organized a mercantile and manufacturers' division to serve as a clearing house for the study and interchange of ideas regarding class freight rates. The rates to be studied apply on manufactured commodities which are produced and distributed by Minneapolis firms.

The Northern Pacific, the Union Pacific and the Great Northern, in conjunction with the University of Idaho and Washington State College, are planning to operate a demonstration train over the lines of these railways in northern Idaho and eastern Washington, carrying exhibits and agricultural experts who will discuss livestock and poultry, crops and general farm activities of the area.

A "Travel Bureau" has been established at the Grand Central Terminal, New York City, in the north balcony facing on the grand concourse. The bureau is enclosed in a handsome steel and glass structure, and although it is within a stone's throw of the ticket offices in the upper level, it is fully equipped as a city ticket office, where prospective travelers may take their time to make their inquiries and study maps and time tables.

St. Louis Southwestern Operates Soil Train

The St. Louis Southwestern is operating over its system a soil improvement demonstration train to show the best methods of soil conservation and soil building. The fruit and truck growing industry is being emphasized, particular attention being given to terracing in the hilly sections and drainage in the lower-lying sections of the country. Various types of machinery used in terracing operations and instruments used in laying off terrace and drainage lines are being demonstrated. The growing of winter cover crops, which play an important part in preventing the washing away of the light soils, is being urged.

Fluctuations in Corn Prices

Not Due to Freight Rates

Ranking first in value of all agricultural products raised in this country, corn comes closer to being an All-American product than almost any other agricultural commodity, as virtually the entire crop is consumed in the United States, according to a study just completed by the Bureau of Railway Economics into the relationship of corn prices to transportation costs.

This country, the study shows, produces about 68 per cent of the world production but only about 2.3 per cent was exported annually from 1921 to 1925, while imports were negligible. Unlike wheat, most of the corn produced in the United States is consumed on the farms, about 80 per cent being fed to live stock. Rail shipments of corn average 15,300,000 tons annually and constitute approximately 17 per cent of the total tonnage of farm crops originating on the principal railroads. The study, which covers each of the crop seasons from 1923 to 1925, showed a very wide range in corn prices received by the farmer in contrast to the stability of freight rates, which remained almost unchanged during that period. The farm price of corn changed more often from week to week than it remained stationary, showing that there is no relationship between freight rates on corn and fluctuations in prices.

Southeast Shippers' Advisory Board Meeting

Continued prosperity was forecasted in reports submitted at the 16th regular meeting of the Southeast Shippers' Advisory Board held at New Orleans, La., on December 10. The volume of business anticipated during the first quarter of 1927 by the coal and coke, fertilizer, iron and steel, machinery, miscellaneous and alcohol industries will be about the same as for the first quarter of 1926, while increases ranging from 5 to 25 per cent over the first three months of this year are expected during the same period of 1927 by the furniture, grain and grain products, lumber and forest products, pulp and paper products and the sugar and petroleum industries. The Alabama-Tennessee coal mines are operating practically 100 per cent and it is expected that this situation will continue at least until April 1. The estimated cotton seed tonnage for movement during the first quarter of 1927 is heavier than previous years because of the lateness of the season and market conditions. Cotton production for 1926 will probably be the greatest in the history of the United States.

The Fresh Fruits and Vegetables committee is endeavoring to improve conditions within the peach industry before the 1927 shipping season, in order to eliminate the marketing difficulties experienced during the past season. The strawberry crop in Louisiana in 1927 is expected to greatly exceed the 1926 crop which established a record over previous years.

Central Western Shippers' Advisory Board Meeting

The 12th regular meeting of the Central Western Shippers' Advisory Board at Lincoln, Neb., on December 8, was attended by 350 persons representing shippers, receivers, distributors, producers, bankers and railroads, which is the largest attendance in the history of the board. The reports rendered by the commodity committees were optimistic for most lines of industry, the Bankers' committee reporting the railroad situation, including service and the attitude toward the public as most satisfactory. Reports anticipate unusual activity for the first quarter of 1927 in the metal mining and smelting industry which indicate the possibility of an increase of approximately 300 per cent in volume of shipments. Through the interest developed by the advisory board in Idaho there has been an increase in storage facilities for perishable crops of over 59 per cent during the past year and this has contributed materially to the stability of agriculture and the resultant prosperity of the state. A survey will be made of the available storage facilities in the five states embraced by the board. The extension of orderly processes in the livestock industry, especially sheep, was advocated strongly for future development.

A resolution was passed to the effect that a committee of five producers and distributors be appointed to develop recommendations designed to bring about uniform action by the railroads of this territory in eliminating the practice of peddling from freight cars. The next meeting of the board will be held on April 7, 1927, at Casper, Wyo.

Commission and Court News

Interstate Commerce Commission

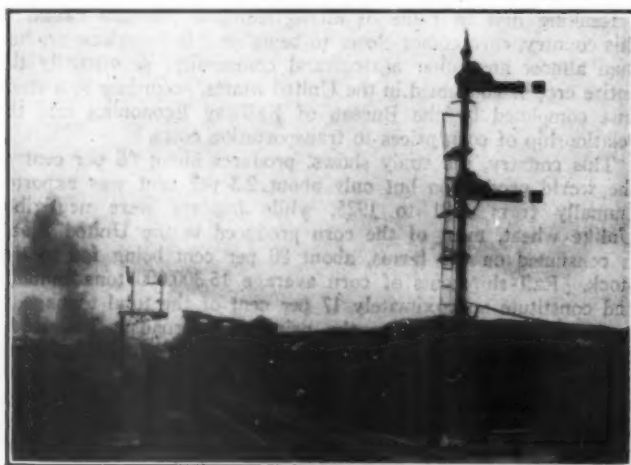
Division I of the Interstate Commerce Commission has denied a motion filed on behalf of the Philadelphia & Reading and subsidiary companies that all further proceedings in the case involving the valuation of their property be vacated, rescinded, withdrawn or stayed and postponed and revised until the tentative valuations served as to these properties have been revised or amended "to comply with all requirements of the law respecting the making and issuing of a lawful valuation." The denial is subject to the right of the carriers and others interested to present to the commission evidence in support of such matters of fact as they may wish to have considered.

The Interstate Commerce Commission on December 18 made public a proposed report by Examiner Hosmer in the port differential case, which was instituted by the Maritime Association of the Boston Chamber of Commerce, in an effort to secure the abolition of the so-called port differentials under which the Boston rates are higher than those to Baltimore and Philadelphia on shipments from the West for export. The examiner recommends a finding by the commission that the rates on ex-lake grain, in bulk, from Buffalo to New York and Boston are unreasonable to the extent that they exceed the corresponding rates to Baltimore and Philadelphia, but that the rates on grain and grain products, in carloads, by all-rail routes from western points to Boston and New York, for export, are not unreasonable.

Oral argument was heard by the Interstate Commerce Commission on December 16 in connection with its investigation of the rates on anthracite, which was re-opened for further consideration of a readjustment of rates from the Pennsylvania fields to northern New York cities. The adjustment proposed by the railroads, which was suspended by the commission, proposes an increase from \$2.65 to \$2.75 a ton in the rates for single-line hauls and a reduction from \$3.02 to \$2.88 for two-line hauls, while some of the rates to intermediate points on the more circuitous routes would be reduced from \$3.28 to \$2.88. H. A. Taylor, general solicitor of the Erie, and A. H. Elder, general solicitor of the Central of New Jersey, said the adjustment proposed represents a serious effort to relieve a situation which has been troublesome for years, because the single-line rates were lower than the other rates. Wilbur La Roe, Jr., appearing for the chambers of commerce of several northern New York cities, opposed the increase in the present single-line rates and said that these should be applied as maxima.

Oregon Construction Discussed with I. C. C.

Plans for the construction of new railroad lines in Oregon and California were discussed at a conference on December 17 at the offices of the Interstate Commerce Commission between Commissioners Aitchison and Meyer, Director Mahaffie of the commission's Bureau of Finance; William Sproule, president of the Southern Pacific; Ralph Budd, president of the Great Northern; Charles Donnelly, president of the Northern Pacific, and Robert E. Strahorn, president of the Oregon, California & Eastern. The commission in May issued a decision on the applications of the railroads for certificates for new construction, authorizing the building of parts of the lines proposed by the Southern Pacific, the Oregon Trunk and the Oregon, California & Eastern railways, on condition that each should grant trackage rights to the other which would make part of the proposed construction unnecessary. The commission then said it would expect the several companies to undertake to come to an understanding which would carry out its conclusions with no unnecessary delay; but several conferences have failed to result in an agreement and the Oregon Public Service Commission, which had asked the commission to require the construction of certain lines different from those proposed by the railroads, had asked the commission to reopen the case. No final understanding was



Remote Control Electric Interlocking, Summit, Mont.

reached at this latest conference, but the railroad officers are to meet with the commissioners again in the near future.

State Commissions

Hearing on Train Lengths in Kansas

On December 10, representatives of the Brotherhood of Railway Trainmen and the Brotherhood of Locomotive Firemen and Enginemen completed the presentation of their testimony before the Public Service Commission of Kansas on excessive freight train lengths which began on December 1. George H. Wood, supervisor of air brakes of the Atchison, Topeka & Santa Fe at Topeka, Kan., testified that the slack in long trains can be controlled, that the air brake system is efficient and that there is no reason why a long train should be handled any more roughly than a short one. John A. Burke, assistant supervisor of air brakes of the Santa Fe, at Topeka, testified that the engineman can keep the slack from running in and out of the train by the judicious application of power or brakes. E. W. Stanley, trainmaster of the Missouri Pacific, testified as to the visibility of signals in daylight. F. W. Grace, superintendent of the Missouri-Kansas-Texas, testified as to shocks on long and short trains.

The railroads submitted the report of an impact recorder which had been placed in the caboose of several trains without the knowledge of the trainman. A total of 400 trips were made and only 15 shocks were recorded, of which four were on trains of 50 cars, four on trains of from 50 to 60 cars, one on trains of from 70 to 80 cars, and six on trains from 60 to 70 cars.

Personnel of Commissions

Cyrus E. Woods Appointed to I. C. C.

Another fight in the Senate over the appointment of a member of the Interstate Commerce Commission was precipitated when President Coolidge on December 20 sent to the Senate the nomination of Cyrus E. Woods, of Greensburg, Pa., for appointment for a seven-year term to succeed Frederick I. Cox, whose term expires with the end of the year, but who had been expected until recently to be reappointed in accordance with the usual practice. A meeting of the Senate committee on interstate commerce was held on the following day to consider confirmation of the appointment by the Senate at once but so much opposition was manifested that it was decided to postpone the matter until after the holidays and then to hold hearings. Mr. Woods was born at Clearfield, Pa., in 1861; was admitted to the bar in 1889 and practiced law at Philadelphia until 1894. He also practiced law at Pittsburgh until 1912, and was general counsel for the Pittsburgh Coal Company. From 1900 to 1908 he was a member of the Pennsylvania state senate and from 1905 to 1908 was president of that body. From 1912 to 1915 he was United States minister to Portugal and from 1915 to 1921 he was secretary of state of Pennsylvania. In 1921 Mr. Woods was appointed ambassador to Spain by President Harding and in 1923 he was appointed ambassador to Japan. He resigned in June, 1924.

Mr. Woods is a Republican and was proposed for the appointment by Senator Reed of Pennsylvania, who has vigorously criticized the Interstate Commerce Commission in the Senate on many occasions for its decision in the lake cargo coal rate case, in which Pennsylvania coal interests, headed by the Pittsburgh Coal Company, unsuccessfully sought a readjustment in the rates on bituminous coal to the lakes to increase the



C. E. Woods

differential under the rates from more southern coal fields. In this connection Senator Reed protested because no representative of Pennsylvania had ever been a member of the commission, saying that if a Pennsylvanian had been on the commission the decision might have been different. The case has since been re-opened and is now pending before the commission. The coal rate controversy, in which Senators from the other coal-producing states also took part, was also brought up in connection with the proposals for regional appointments to the commission and the opposition to the appointment of Thomas F. Woodlock, which was confirmed after some of the opposition had been removed by an announcement from the White House that "in filling future vacancies" on the Interstate Commerce Commission President Coolidge intended to give special consideration to the South, Southwest and Pennsylvania. There has been much talk as to what was meant by the word "vacancies" in this connection, but it has been stated unofficially that the President did not interpret this to mean the expiration of a term, because of the usual practice of reappointing members of the Interstate Commerce Commission and the Shipping Board, but only such a vacancy as would be caused by the death or resignation of a commissioner.

Vigorous opposition to the confirmation of Mr. Woods by the Senate was voiced by supporters of Commissioner Cox, who is from New Jersey, and who was appointed by President Harding as a representative of the commercial travelers. Particular opposition was expressed by some of the Senators from Kentucky and other states in the southern coal fields, because of the pendency of the coal rate case and the fact that Mr. Woods was at one time counsel for the principal complainant.

Senator Smith of South Carolina announced in the Senate on December 17 that immediately after the holidays he would use every effort to get consideration in the Senate for his bill, S. 2808, to reorganize the Interstate Commerce Commission along regional lines.

Court News

Effect of Strike Clause in B. L.

A strike clause in a contract of interstate shipment is valid, even if the strike is in existence when the contract was made. When the carrier has shown the existence of the strike and that the delay alleged was caused thereby, the burden is on the plaintiff shipper to show negligence of the carrier in connection with the strike or the delay.—*Mourer v. Wabash* (Mo. App.) 280 S. W. 1050.

Logging Railroad a Common Carrier

The Arkansas Supreme Court holds that a railroad organized under the state statutes, C. & M. Dig. §8419 et seq., is a common carrier although it carries only a particular kind of freight, such as logs, for a single customer; and, as such, it would be liable for fire damage to crops under §8569, making railroads liable for fire caused by their operation, independently of negligence.—*Helena Southwestern v. Coolidge* (Ark.) 275 S. W. 896.

Use by Railroad of Its Right of Way

The South Carolina Supreme Court holds that the breaking down of a fence by a railroad, while digging a well on its right of way, allowing the cattle of the landowner to get out and damage his oats, was not forcible entry and detainer under the state statute, so as to permit the trebling of damages, but the railroad would be liable in actual damages if the work had been done negligently.—*Brown v. Southern* (S. C.) 131 S. E. 681.

Railroad's Lien for Demurrage;

Privately Owned Cars

The Mississippi Supreme Court holds that a railroad's lien for demurrage cannot be sold or assigned, and is lost if the railroad surrenders possession. Privately owned cars are subject to demurrage. As between shipper and consignee, the one in fault is liable for the demurrage.—*Vanderbilt v. Planters' Oil & Gin Co.* (Miss.) 106 So. 14.

United States Supreme Court

Regulation of Locomotive Equipment of Interstate Railroad Within Exclusive Jurisdiction of Congress

Three cases came before the Supreme Court of the United States, one on appeal from the federal district court for northern Georgia, *Napier v. Atlantic Coast Line*, 2 Fed. (2d) 891, and two on writ of error to the Supreme Court of Wisconsin, *Chicago & North Western v. Railroad Commission* and *Chicago, Milwaukee & St. Paul v. Railroad Commission*, known as the *Cab Curtain Cases*, 188 Wis., 232, involving a determination of the scope and effect of the federal boiler inspection act. The main question in all three cases was whether the act has occupied the field of regulating locomotive equipment used on an interstate railroad so as to preclude state legislation. The Georgia case involved a Georgia statute prescribing an automatic door to the firebox, the enforcement of which the district court enjoined. The Wisconsin cases involved a Wisconsin statute prescribing a cab curtain, where the state Supreme Court denied the injunction sought by the railroads. In Georgia the details of the device were prescribed by the legislature. In Wisconsin the specifications were prescribed by an order issued by the state Railroad Commission.

The Supreme Court has affirmed the decree of the Georgia federal district court and reversed the state court's judgment in the Wisconsin cases.

The court in its opinion says that: "Prior to the passage of the boiler inspection act, Congress had, by the safety appliance act and several amendments, itself made requirements concerning the equipment of locomotives used in interstate commerce. It had required a power driving-wheel brake, automatic couplers, grabirons, drawbars, ash pans, and other things. Congress first conferred upon the Interstate Commerce Commission power in respect to locomotive equipment in 1911. The original act applied only to the boiler." The provisions of that act were extended in 1915 to include the entire locomotive and tender and all parts and appurtenances thereof. In 1924, section 2 of the original act was amended, making it unlawful to use any locomotive unless in proper condition and safe to operate and unless inspected from time to time in accordance with the provisions of the act and able to withstand the tests prescribed in the rules and regulations therein provided for. "Other sections," the opinion says, "confer upon inspectors and the commission power to prescribe requirements and establish rules to secure compliance with the provisions of section 2. From time to time since the passage of the original act, the commission has required that locomotives used in interstate commerce be equipped with various devices. But it has made no order requiring either a particular type of fire-box door or a cab curtain. Nor has Congress legislated specifically in respect to either device."

The automatic fire-door, the court says, conserves the health and eyesight of the fireman, and protects the safety of the employees, and incidentally of the train, in the event of an explosion in the fire-box, and that of travelers at grade crossings by preventing the glare from the open door blinding the fireman for a time and so possibly interfering with his duty as a lookout. The purpose of the cab curtain is to protect engineers and firemen from the weather during the winter season.

"Does the legislation of Congress manifest the intention to occupy the entire field of regulating locomotive equipment? It did not do so by the safety appliance act nor by the original boiler inspection act. But the power delegated to the commission by the boiler inspection act as amended is a general one. It extends to the design, the construction and the material of every part of the locomotive and tender and of all appurtenances of motive equipment.

"The question whether the boiler inspection act confers upon the Interstate Commerce Commission power to specify the sort of equipment to be used on locomotives was left open in *Vandalia v. P. S. C.*, 242 U. S. 255. We think that power was conferred. The duty of the commission is not merely to inspect. It is, also, to prescribe the rules and regulations by which fitness for service shall be determined. Unless these rules and regulations are complied with, the engine is not 'in proper condition' for operation. Thus the commission sets the standard. By setting the standard it imposes requirements. The power to require specific devices

was exercised before the amendment of 1915, and has been extensively exercised since.

"The fact that the commission has not seen fit to exercise its authority to the full extent conferred has no bearing upon the construction of the act delegating the power. We hold that state legislation is precluded, because the boiler inspection act, as we construe it, was intended to occupy the field. The broad scope of the authority conferred upon the commission leads to that conclusion. Because the standard set by the commission must prevail, requirements by the states are precluded, however commendable or however different their purpose. . . . If the protection now afforded by the commission's rules is deemed inadequate, application for relief must be made to it. The commission's power is ample. Obviously, the rules to be prescribed for this purpose need not be uniform throughout the United States; or at all seasons; or for all classes of service."—*Napier v. A. C. L.*; *C. & N. W. v. Railroad Commission*; *Chicago, M. & St. P. v. Railroad Commission*. Decided November 29, 1926. Opinion by Mr. Justice Brandeis.

I. C. C. Sustained in Buffalo Canal Terminal Case

The Supreme Court of the United States has reversed the judgment of the federal district court for northern New York enjoining the enforcement of an order of the Interstate Commerce Commission requiring the New York Central to provide transportation service between the public terminal of the Erie Barge Canal at Buffalo and shippers located along its tracks and along the lines of other railroads with which it can interchange traffic. The service demanded includes the furnishing of cars, motive power, and the placing of cars on the tracks within the terminal. (*N. Y. C. v. U. S.*, 13 Fed. (2d) 200). In granting the injunction, the Supreme Court says, the district court disregarded the intervention of two canal carriers on the ground that they were not shown to be engaged in interstate commerce, and, construing section 6, par. 13, of the amended Interstate Commerce Act to require the presence of two carriers before the Commission subject to its jurisdiction, held that the Commission was without jurisdiction to grant the relief sought because there were not two carriers before it, and further, that the complainant (the State of New York) a sovereign state, as owner of the terminal but not a carrier, was beyond its regulatory powers, and presumably could not invoke its jurisdiction.

The Supreme Court holds that the jurisdiction of the Commission was properly invoked. "A state, when its interests are concerned, as well as a private individual, whether carrier or not, may file a complaint with the Commission. Interstate Commerce Act, § 13, as amended June 18, 1910, c. 309, 36 Stat. 550. Moreover, a complaint is not a prerequisite to the exercise of jurisdiction by the Commission. It may of its own motion investigate and act upon any matter which may be the subject of complaint (with exceptions not now relevant). Hence the only question that need be considered here is the power of the Commission, assuming there was but one carrier before it, to issue the order now attacked. . . . The only parties concerned in the order actually made were those before the Commission; appellee, which was required to furnish the service, and the State of New York, whose terminal facilities were thus to be used. To have required the presence of one or more canal carriers before the Commission for the purpose of making this order would have been an idle ceremony. . . . We conclude that the Commission had authority to make the order and that its findings were supported by the evidence."

As to whether the Commission's jurisdiction extended to the entire current of commerce flowing through the terminal, although intrastate in part, the court said:

"Where as here interstate and intrastate transactions are interwoven, the regulation of the latter is so incidental and inseparable as properly to be deemed included in the authority over interstate commerce. This was the view of the state court. (*People ex rel. N. Y. C. v. P. S. C.*, 198 App. Div. 436, affirmed 232 N. Y. 606). An interpretation of the statute which would in practice require the segregation of all shipments in interstate commerce would make compliance with the Commission's orders impossible and defeat the purpose of the Act." *U. S. v. N. Y. C.* Decided November 22, 1926. Opinion by Mr. Justice Stone.

Foreign Railway News

Rhodesian Railways to Continue

in Private Ownership

The financial results of the operation of the Beira and Mashonaland and Rhodesia railways for the nine months ended June 3, 1926, have recently been published in the general manager's bulletin of the South African Railways, and, while the total earnings in South Africa increased by £89,789, over the corresponding period of the previous year, the total gross operating expenditure increased by no less than £287,209. The increased earnings were primarily due to the large coal and coke traffic handled, especially for the Congo, though as an offset against the increased revenue from this source, there must be put the falling-off in railways construction material carried to the Congo and in the tonnage of copper exported from that territory.

The heavy increase in expenditure was caused by repairs to the track which were necessary owing to the extensive wash-outs during the last rainy season, particularly on the Beira line; higher standard of maintenance of track rendered necessary by the increasing traffic; increased cost of maintenance of engines and rolling stock due to a larger number coming in for general overhaul; and greater number of staff employed to cope with the increased traffic and higher costs incidental to tram operation, the train mileage having risen from 3,022,337 during the corresponding period of the previous financial year to 3,240,236 during the period under review.

A continued improvement in the number of passengers traveling is again shown, and revenue from this source, apart from third-class passengers, also shows an appreciable increase.

Coal and coke traffic continued to grow in the nine months in question, there being considerable increases of tonnage under the heads of these commodities carried for the railways, the Union Minière du Haut Katanga and the Chemin de Fer du Katanga.

Speaking at the opening of the recent Rhodesia Agricultural Union Annual Congress, Sir John Chancellor, the governor of Southern Rhodesia, dealt with conversations he had had with the secretary of state in regard to the question of railway control, and, in concluding the portion of this speech dealing with transportation matters, said: "As you are aware, in view of the fact that the railway companies were not sellers, as well as for other cogent reasons, the consideration of the question of purchase of the railways by the government had almost of necessity to be deferred. In spite of the fact that a year ago a large number—perhaps the majority—of the people of Rhodesia favored purchase, I believe that there is now a fairly general consensus of opinion that in seeking to obtain control over the rate-charging powers of the railways, the government was doing all that was necessary and practicable at the present time. There are, however, probably a large number of people in the colony who still favor purchase at a later date if and when a favorable opportunity offers; and it may be that a time may come when that will be the wisest course to take. But in the meantime I do urge them not to adopt a hostile or antagonistic attitude towards the railways. There is no need for it and there is nothing to be gained by it. Let us remember that the country and the railway companies have a fundamental interest in common, which is to create traffic, to create more traffic, and again more traffic. The railway companies and the people of Rhodesia have, therefore, this interest in common—the development of the resources of the country. So long as both sides remember that, the room for differences between them cannot be wide. I have heard people talk of the railways having a strangle-hold on the country. But let us try to imagine what the position of Rhodesia would have been to-day had there been no railways, and let us remember that without the British South Africa Company the railways would certainly not have been built so quickly, and perhaps some of them would not have been built at all. When the government has established control over the rates chargeable by the railways, as they will be empowered to do under the new railway legislation, I shall not be surprised if the railway authorities complain that the government of Southern Rhodesia has got a strangle-hold on them."

Equipment and Supplies

Locomotives

THE SYDNEY & LOUISBURG has ordered two six-wheel switching locomotives from the American Locomotive Company Montreal works. These locomotives will have 19 in. by 26 in. cylinders and a total weight in working order of 132,000 lb.

THE NEW YORK, NEW HAVEN & HARTFORD has ordered 10 Mountain type three-cylinder locomotives from the American Locomotive Company. These locomotives will have 22-in. by 30-in. cylinders and a total weight in working order of 374,000 lb.

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered 25 Mikado type locomotives and 10 Mountain type locomotives from the American Locomotive Company. The Mikado type locomotives will have 28 in. by 30 in. cylinders and a total weight in working order of 351,000 lb.; the Mountain type will have 28 in. by 28 in. cylinders and a total weight in working order of 365,000 lb. Inquiry for this equipment was reported in the *Railway Age* of November 27.

Freight Cars

THE CHAMPLIN REFINING COMPANY, Enid, Okla., is reported to be inquiring for from 100 to 300 tank cars.

THE LOUISVILLE, HENDERSON & ST. LOUIS has ordered fifteen 40-ton stock cars from the American Car & Foundry Company.

THE CHICAGO & NORTH WESTERN has ordered 250 ore cars from the Pullman Car & Manufacturing Corporation. Inquiry for this equipment was reported in the *Railway Age* of November 27.

THE MOBILE & OHIO is inquiring for 250 steel underframe flat cars; 150 50-ton steel frame hopper cars; 200 double drop bottom steel frame gondola cars all of 50 tons' capacity and 15 all-steel air dump cars of 20 cu. yd. capacity.

THE CONLEY TANK CAR COMPANY has ordered 100 tank cars of 8,000-gal. capacity from the American Car & Foundry Company. This is in addition to 200 ordered from the same builder and reported in the *Railway Age* of November 20.

THE NEW YORK CENTRAL has ordered 10 automatic steel air dump cars from the Clark Car Company, in addition to 20 ordered from the same builder and reported in the *Railway Age* of December 11. An order for 10 automatic steel air dump cars has also been given to the Koppel Industrial Car & Equipment Company.

THE LEHIGH VALLEY has ordered 500 hopper cars of 70 tons' capacity from the Standard Steel Car Company; 500 double sheathed box cars of 55 tons' capacity and 200 automobile cars of 50 tons' capacity from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of November 27 and December 4.

THE CHICAGO, MILWAUKEE & ST. PAUL has ordered 500 automobile box cars from the Pullman Car & Manufacturing Corporation and 500 stock cars from the Bettendorf Company. The original inquiry, as reported in the *Railway Age* of October 2, included 1,000 automobile cars and from 500 to 1,000 stock cars, but the federal court at Chicago approved the purchase of only 500 automobile and 500 stock cars.

Passenger Cars

THE DENVER & RIO GRANDE WESTERN has ordered four steel dining cars from the American Car & Foundry Company.

THE CHICAGO & NORTH WESTERN is inquiring for 100 steel and aluminum passenger coaches and 20 steel and aluminum combination passenger and baggage cars.

THE NORFOLK & WESTERN has ordered three dining cars from the Pullman Car & Manufacturing Corporation. Inquiry for this equipment was reported in the *Railway Age* of December 11.

Machinery and Tools

THE LOUISVILLE & NASHVILLE has ordered one standard railroad ditcher from the American Hoist & Derrick Company.

Iron and Steel

THE LOS ANGELES & SALT LAKE has ordered 150 tons of beam and deck girder spans for use at Los Angeles, Cal., from the American Bridge Company.

THE WESTERN PACIFIC has ordered 995 tons of through riveted truss and plate girder spans for use at Elko, Nev., from the Virginia Bridge & Iron Company.

THE PENNSYLVANIA is inquiring for 1,000,000 tie plates, 175,000 pairs of angle bars, 4,500,000 lb. of spikes and 830,000 track bolts. These contracts make it possible for the company to secure these quantities of material next year although it is possible that orders will not be placed for the full amount.

Miscellaneous

THE NEW ORLEANS GREAT NORTHERN contemplates buying a turn table 80 ft. long, electrically operated, to carry 250 tons. The turn table is to be installed in its new terminals at Jackson, Miss., and delivery required about March 1.

Signaling

THE SEABOARD AIR LINE has ordered from the Union Switch & Signal Company a Saxby & Farmer mechanical interlocking machine, 13 working levers, for installation at Fort Myers, Fla.

THE ALABAMA SUPREME COURT holds that a railroad, sued for killing a horse, is entitled to have its defense, based on its engineer's testimony that he kept a lookout and used all available means to stop, submitted to the jury, even if there was evidence sufficient to afford an inference that the testimony was untrue.—*Bugg v. Meredith (Ala.) 107 So. 805.*



Engine Crews on the P. R. R.'s Congressional Limited Take Pride in Keeping the Name Plate Highly Polished

Supply Trade News

Fred W. Foehringer, formerly sales representative of the Adams & Westlake Company, has been appointed general manager of the **Kelly Brass Works**, with headquarters in Chicago.

R. L. Stanton has joined the staff of the **American Brown Boveri Electric Corporation** at its Camden, N. J., plant, as an application engineer in the blower section, and **Frank T. Horan** of the drafting department is now detailer on oil circuit breakers, in the design section of the electro-mechanical division.

Stone & Webster, Inc., and **Blodget & Company** have formed a new company under the name of **Stone, Webster & Blodget, Inc.**, with headquarters in New York. The company will begin operations on January 1, 1927, with an authorized capital of \$10,000,000. The corporation is a combination of the securities department of Stone & Webster, Inc., and the investment house of Blodget & Company. The engineering and construction, management, and investigating departments of Stone & Webster, Inc., are not included and will not be affected by the combination. Bayard F. Pope, now a partner of Blodget & Company, will be president of the new corporation. Other officers and the directors will be drawn from both the participating companies, all the present partners of Blodget & Company being officers of Stone, Webster & Blodget, Inc.

Obituary

Henry M. Giles, general superintendent of the South Philadelphia plant of the Westinghouse Electric & Manufacturing Company, died on December 14, in the Hotel Dennis, Atlantic City, N. J., at the age of 57. Mr. Giles had been with the Westinghouse Company since 1900, first as superintendent of the Corliss engine department and subsequently was promoted to marine superintendent, serving until 1919, when he was transferred to the South Philadelphia plant as general superintendent.

Railway Construction

CHICAGO & NORTH WESTERN.—This company contemplates the construction of an extension, 16 miles long, near Bellefourche, S. D., to develop a sugar beet raising section.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—Bids will close on December 27 for the construction of an engine terminal and shops at Riverside yards, Cincinnati, Ohio, estimated to cost \$700,000.

THE HEARING before the Public Service Commission of Kansas on a complaint filed by the Brotherhood of Railway Trainmen and the Brotherhood of Locomotive Firemen and Enginemen on excessive freight train lengths on six major railroads in Kansas which began on December 1, was ended on December 18.

COMMUTERS who read newspapers on the train as they ride to work in the morning number 78 per cent of the whole number of passengers, in a count made on suburban trains of the East Bay Electric line (San Francisco) of the Southern Pacific. Books and magazines were observed in the hands of 11 per cent of the passengers. Fancy work engaged the attention of four per cent, while seven per cent were engaged in conversation or were gazing out of the window. On the evening trains, passengers going home, have newspapers in apparently equal volume, but not so many of the passengers are actually reading; there is more conversation.

Railway Financial News

BALTIMORE & OHIO.—Asks Authority to Operate Short Line.—This company has applied to the Interstate Commerce Commission for authority to operate under agreement as part of its system the line of the Indian Creek Valley, from Indian Creek to Blair Mine, Pa., 27 miles. The B. & O. owns all of the capital stock of the company.

BUFFALO, ROCHESTER & PITTSBURGH.—Proposed Lease.—Oral arguments were heard by the Interstate Commerce Commission on December 21 on the application of the Delaware & Hudson for authority to lease this property for 999 years, which the commission's examiner, in a proposed report, recommended should be denied by the commission. Charles E. Hughes, appearing for the D. & H., said that the absence of direct physical connection between the two roads, which was the principal objection made by the examiner, is not controlling in a case in which the plan is in the public interest, and he said the commission has so held in another case. He said that the plan had been approved by the security-holders of both companies, by industries and communities along the line, and that the only objection was from rival railroads "that have plans of their own." R. Marsden Smith, general attorney of the Baltimore & Ohio, and Clyde Brown, general solicitor of the New York Central, presented arguments in opposition.

CARBON COUNTY.—Abandonment.—This company has applied to the Interstate Commerce Commission for authority to abandon operation as to interstate commerce of its line from a connection with the Denver & Rio Grande Western to the plant of the Columbia Steel Corporation in Carbon county, Utah, 4.79 miles.

CENTRAL INDIANA.—Abandonment.—The Interstate Commerce Commission has made public a proposed report by Examiner Molster recommending a finding by the commission that public convenience and necessity have not been shown to permit the abandonment of the line of this company, from Muncie to Brazil, Ind., 127.12 miles. The company is controlled by the Pennsylvania Company and the Cleveland, Cincinnati, Chicago & St. Louis.

CENTRAL OF GEORGIA.—New Director.—L. A. Downs, president of the Illinois Central, has been elected a director succeeding W. W. Banks, resigned. Mr. Downs was formerly president of the Central of Georgia.

CENTRAL OF NEW JERSEY.—Extra Dividend.—Directors have declared a dividend of \$2.00 payable January 15 to stockholders of record December 27. The Central of New Jersey pays 8 per cent regular dividends and since 1909 has been paying 2 per cent extra dividends semi-annually on January and July 15.

CHESAPEAKE & OHIO.—Lease.—This company has applied to the Interstate Commerce Commission for authority to renew its lease of the Island Creek for one year.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—Extra Dividend.—Directors have declared an extra dividend of 1 per cent on the common stock in addition to the regular semi-annual dividend of 2½ per cent on the common and 2 per cent on the preferred, all payable January 1 to stockholders of record December 24. The Monon has been paying 2½ per cent semi-annual dividends on the common stock since January 10, 1925 and it paid an extra of 1 per cent on the common stock in July, 1926.

CHICAGO, MILWAUKEE & ST. PAUL.—Hearings.—The hearing on the confirmation of the sale and plan of reorganization of the Chicago, Milwaukee & St. Paul, was concluded on December 17. The bondholders' defense committee, which is opposing the confirmation, was asked by Federal Judge Wilkerson to file briefs by December 28. The securities deposited under the plan of reorganization, as promulgated by Kuhn, Loeb & Co. and the National City Bank, comprise 72.4 per cent of the common stock, 68.5 per cent of the preferred stock, and 82.8 per cent of the bonds.

Iselin Committee Drops Protest.—Ernest Iselin, chairman of the Iselin Stockholders Committee, has announced that his committee has dropped such opposition as it had to the reorganization plan and the confirmation of the sale of the property. His statement follows:

"We have always stood for the policy of extending and refunding the debt to the government of \$55,000,000. We secured from reorganization managers modification of the plan promising substantially corresponding reductions in the assessment, if refunding and extension were obtained. These modifications expired in June, 1926, and the plan submitted to the court did not include them. As there are still several months before the matter can be determined by the Interstate Commerce Commission, we felt that the possibility of extension should be recognized in the court's order and filed a petition to that effect. We are glad to say that on Monday counsel for the reorganization managers cleared this matter up by making the following statement to the court:

"The purchasers and the new company will have no objections to the insertion in the order of confirmation of a provision that if legislation in substantially the form of the Gooding Bill is enacted by Congress on or before March 3, 1927, and is approved by the President, the reorganization plan shall not be consummated until the reorganization managers have endeavored to bring about an agreement with the Secretary of the Treasury for the refunding of all or a substantial part of the indebtedness to the government, and have reported the result of their efforts to this court for such action as this court may determine, and that this court reserves exclusive jurisdiction to pass upon any modification of the reorganization plan which may result, in the manner provided by the final decree with respect to the present plan.

"The form of order which we shall submit at the closing of this hearing will contain such a provision."

"We are satisfied with the above statement and gladly join with the reorganization managers in asking for a decree of confirmation of sale."

"The bill which should lighten the St. Paul stockholders' burden of their very large and onerous assessments is making good progress. We have been informed from Washington today that the steering committee of the Senate has given it first place among the bills which are to be taken up by the Senate after the rivers and harbors bill has been voted upon. The Senate should reach it for consideration in the first week of the new year. Once the bill has passed the Senate our information tends to make us take an optimistic view of its chances for passing the House."

DENVER & SALT LAKE.—Reorganization.—The Interstate Commerce Commission on December 22 made public its order approving the plan of reorganization by which the new railway company is authorized to acquire and operate the line of the old railroad company from Utah Junction to Craig, Colo., and also to acquire control by lease of a new Northwestern Terminal Railroad, which succeeds the old Northwestern Terminal Railway. The new Denver & Salt Lake railroad is to issue 32,000 shares of no-par stock and \$2,500,000 of first mortgage 6 per cent bonds and \$11,000,000 of income-mortgage bonds. The new terminal company is also authorized to issue 2,217 shares of no-par stock and \$2,217,000 of first mortgage bonds. Chairman Eastman dissented.

GEORGIA & FLORIDA.—Equipment Trust.—The receiver has been authorized by the Interstate Commerce Commission to issue \$750,000 of equipment trust certificates and \$250,000 of receiver's certificates, in connection with the procurement of new equipment.

LOUISVILLE & NASHVILLE.—Increased Dividend.—Directors have declared a semi-annual dividend of \$3.50 payable February 10 to stock of record January 14. This places the stock on a 7 per cent annual dividend basis. The Louisville & Nashville paid a 7 per cent dividend from August, 1916, to May, 1923, when a stock dividend of 62½ per cent was paid and the dividend rate changed to 5 per cent on the increased capitalization. The annual rate was increased to 6 per cent in August, 1924. An extra dividend of ½ per cent was paid last August, making disbursements in 1926 total 6½ per cent.

MACON & BIRMINGHAM.—Abandonment.—The Interstate Commerce Commission has issued a certificate authorizing this company to abandon its line extending from Sofkee, Ga., to La Grange, 96.6 miles. This company went into receivership in February, 1908, and operation was discontinued by order of the court in November, 1922.

MARSHALL, ELYSIAN FIELDS & SOUTHEASTERN.—Abandonment.—The Interstate Commerce Commission has issued a certificate authorizing this company to abandon its line from Marshall, Tex., southeasterly to Elysian Fields, 18 miles. This company was formerly a part of the Marshall & East Texas, the receiver of which was authorized to discontinue operation in 1917 and 1918. The portion of the line between Marshall and Elysian Fields was taken over by certain citizens of Marshall and has been operated with automobile trucks fitted with flanged wheels for freight traffic only. The road's difficulty has been lack of traffic.

MICHIGAN CENTRAL.—Regular Dividend.—Directors on December 15 declared a semi-annual dividend of 17½ per cent on the capital stock payable January 29 to stockholders of record December 30.

MINNEAPOLIS & ST. LOUIS.—Receiver's Certificates.—The Interstate Commerce Commission has granted authority for the issuance of \$100,000 receiver's certificates to renew an obligation of like amount maturing in December, 1926.

MISSOURI PACIFIC.—Bonds.—The Interstate Commerce Commission has authorized the issuance of \$13,156,000 5¼ per cent bonds secured by pledge of New Orleans, Texas & Mexico stock and their sale to Kuhn, Loeb & Co. at 97.

MOBILE & OHIO.—Extra Dividend.—Directors have declared an extra dividend of 3 per cent on the common stock in addition to the regular semi-annual dividend of 3½ per cent both payable December 30 to stockholders of record December 23. A similar extra dividend of 3 per cent was also declared in 1925.

MONONGAHELA.—Acquisition.—In the interest of a general plan developed by the B. & O., the Pennsylvania, and the Pittsburgh & Lake Erie, for the unified operation in the service and development of the large coal producing territory south of Brownsville, Washington County, Pa., the Monongahela, controlled by the Pennsylvania, and the Pittsburgh & Lake Erie, has been authorized by the Interstate Commerce Commission to operate over the lines of the Pennsylvania from Pittsburgh to West Brownsville Junction, and from there to Crucible, Pa., and to acquire the control of the Chartiers Southern, now controlled by the B. & O., the Lake Erie, and the Panhandle, by purchase of stock after that line has acquired control of the Pennsylvania's Ten Mile run branch from Millsboro to Besco, and a part of the line in Washington and Greene Counties, namely that from a point near Pittsburgh to Washington. The Monongahela has also been authorized to acquire the Indian Creek & Northern, a line from Lowesville to Arnettville, W. Va., controlled by the B. & O., and of the Catawba and Paw Paw branches of the B. & O., or those lines from Catawba Junction to Rivesville Junction, W. Va., and from Fairmont to Catawba Junction and then to Grant Town. The Baltimore & Ohio, under the plans of the holding companies will purchase a one-third interest in the Monongahela from the present held lines on the basis of the book value of the Monongahela assets.

NEW YORK, CHICAGO & ST. LOUIS.—Stock.—The Guaranty Company of New York and Lee, Higginson & Co. have sold \$6,848,500 6 per cent cumulative preferred stock, series A, at 103.50 to yield about 5.80 per cent. This stock has been hitherto held in the treasury and, including it, the amount of preferred stock outstanding will total \$32,687,000. The proceeds from the sale of stock are to be used for reimbursement of the treasury for expenditures for additions and betterments heretofore made.

NEW YORK, NEW HAVEN & HARTFORD.—Mergers.—The New York Public Service Commission has approved the merger of the Harlem River & Portchester and the Central New England authorized by the stockholders some time ago and announced recently as having been made possible by the acquisition of all of the outstanding stock of the Central New England. The Harlem River & Portchester is a six-track line extending from New Rochelle, N. Y., to the Harlem River. The Central New England operates the Poughkeepsie bridge route.

OKLAHOMA & ARKANSAS.—Abandonment.—The Interstate Commerce Commission has issued a certificate authorizing M. E. Gaskill to abandon this company's line in Mayes and Delaware counties, Oklahoma, 20.2 miles. The company was placed in receivership on August 16, 1924, and the receiver discontinued its operation in September, 1925.

PEORIA TERMINAL COMPANY.—Reorganization.—A certificate has been issued authorizing the Peoria Terminal Company, a new corporation organized in the interest of the Chicago, Rock Island & Pacific, to take over the line between Peoria, Ill., and Pekin, 7.69 miles, formerly operated by the Peoria Railway Terminal Company which has been in receivership since August 3, 1922. At the same time the Interstate Commerce Commission authorized the company to issue \$500,000 common stock and \$1,000,000 general mortgage 5 per cent bonds which are to be

taken by the Rock Island and also authorized the Rock Island to take over the control of the terminal company property. The Peoria Terminal Company was formerly controlled equally by the Rock Island and the Chicago & Alton and its bonds were guaranteed by the two proprietary companies. Since the Alton went into receivership in 1922, it has failed to make any payment toward the interest on the terminal company bonds and later the Rock Island acquired the Alton's interest.

RICHMOND, FREDERICKSBURG & POTOMAC.—Extra Dividend.—Directors on December 17 declared an extra dividend of 5 per cent on the \$1,316,900 voting common stock in addition to the regular semi-annual dividend of 3½ per cent payable December 31. The company paid a similar dividend of 5 per cent on this issue in December, 1925.

SEABOARD AIR LINE.—Acquisition.—This company has applied to the Interstate Commerce Commission for authority to acquire control of the Gainesville Midland, operating from Gainesville to Fowler Junction, Ga., 38 miles.

STOCKTON TERMINAL & EASTERN RAILROAD.—Operation of Line.—This company has been authorized by the Interstate Commerce Commission to take over and operate the property of the Stockton Terminal & Eastern Railroad Company extending from Stockton, Cal., to Bellota, 21.218 miles. This company was sold at a foreclosure sale on November 8, 1919, and has been operated since by a committee of the bondholders of the old company. The line is an independent property. At the same time the commission also authorized the issuance of \$92,000 common capital stock.

SUMPTER VALLEY.—Securities.—This company has applied to the Interstate Commerce Commission for authority to issue \$650,000 of first mortgage 6 per cent serial gold bonds, to be sold to the Lumbermen's Trust Company of Portland, Ore., at 91.5, and \$100,000 of 7 per cent promissory notes in favor of the Oregon Lumber Company.

VIRGINIAN.—Dividend.—Directors on December 14 declared a dividend of 7 per cent on the common stock payable December 31 to stock of record December 21. An initial dividend on this issue of 4 per cent was paid in 1923, 4 per cent in 1924 and 6 per cent in 1925.

WACO, BEAUMONT, TRINITY & SABINE.—Asks to Be Included in Merger.—This company has filed a petition with the Interstate Commerce Commission in connection with the application of the Texas & New Orleans for authority to take over for unified operation eleven of the Southern Pacific lines in Texas and Louisiana, asking that the commission make provision for the inclusion of the Waco property unless it is included in the proposed merger of the Kansas City Southern, Missouri-Kansas-Texas and St. Louis Southwestern. The Waco company has asked the commission for a certificate to extend its own lines but says that if it is not permitted to develop and extend its properties as proposed and/or unless its properties be incorporated with the M.-K.-T. or other system, its properties will remain mere branch feeder lines of the Houston East & West Texas, Texas & New Orleans and International-Great Northern, delivering its outbound traffic in about equal proportions to the Southern Pacific and Missouri Pacific systems.

"We are being batted like a tennis ball, back and forth, by these big systems," the petition asserts. "If we were granted our convenience certificates and the Kansas City Southern can be prevented from buying up or buying off our friends, we would cheerfully undertake to give an account of ourselves, to work out our own salvation and to save the public that we serve from the disaster that a failure of operations by the Waco will devolve upon it. But the years are passing and the physical condition of our properties grows steadily worse. If the commission grants us relief under our convenience applications, or, as a condition to unification of the Kansas, M.-K.-T. and St. Louis, requires the inclusion, rehabilitation and extension of our properties, we care nothing about inclusion with the Southern Pacific. But if the contrary occurs, it will become imperative, if our lines are not to go down to disaster, for the commission to consider, under the existing status of the law, whether our lines should be unified with the Southern Pacific or Missouri Pacific and by what means the commission can enforce or influence an observance of its views regarding the public interest, on either the

Southern Pacific or Missouri Pacific. It is only when applications of this and of similar nature come before the commission that the commission has power to conditionally order the inclusion of a short line."

WISCONSIN CENTRAL.—Notes.—Dillon, Read & Co. sold on December 22 \$7,500,000 three-year 5 per cent secured notes at 99. The issue is secured by \$10,000,000 first and refunding mortgage 5 per cent bonds and is guaranteed as to principal and interest by the Minneapolis, St. Paul & Sault Ste. Marie which controls the Wisconsin Central by ownership of a majority of its stock. The proceeds will be used to retire \$6,000,000 5½ per cent notes, due April 1, 1927, and for other corporate purposes.

Average Price of Stocks and Bonds

	Dec. 21	Last Week	Last Year
Average price of 20 representative railway stocks	104.34	102.78	97.11
Average price of 20 representative railway bonds	97.67	97.21	94.15

Dividends Declared

Albany & Susquehanna.—4½ per cent, payable January 1 to holders of record December 15.

Baltimore & Ohio.—Common, 1½ per cent, quarterly; common, ½ per cent, extra; preferred, 1 per cent, quarterly, all payable March 1 to holders of record January 15.

Boston & Maine.—Preferred initial, \$2.33; first preferred A, \$2.50, semi-annually; first preferred B, \$4.00, semi-annually; first preferred C, \$3.50, semi-annually; first preferred D, \$5.00, semi-annually; first preferred E, \$2.25, semi-annually, all payable January 1 to holders of record December 17.

Boston & Providence.—2½ per cent, quarterly, payable January 1 to holders of record December 20.

Canada Southern.—1½ per cent, semi-annually, payable February 1 to holders of record December 30.

Chicago, Indianapolis & Louisville.—Common, 2½ per cent; common, 1 per cent, extra; preferred, 2 per cent, all payable January 10 to holders of record December 24.

Cincinnati Northern.—5 per cent, semi-annually, payable January 20 to holders of record January 13.

Cleveland, Cincinnati, Chicago & St. Louis.—Common, 1¾ per cent, quarterly; preferred, 1¼ per cent, quarterly, both payable January 20 to holders of record December 30.

Great Northern.—2½ per cent, semi-annually, payable February 1 to holders of record December 30.

Joliet & Chicago.—1¾ per cent, quarterly, payable January 3 to holders of record December 23.

Kansas City Southern.—Preferred, \$1.00, quarterly, payable January 15 to holders of record December 31.

Mahoning Coal Railroad.—Common, \$12.50, payable February 1 to holders of record January 14. Preferred, \$1.25, semi-annually, payable January 3 to holders of record December 27.

Michigan Central.—\$17.50, semi-annually, payable January 29 to holders of record December 30.

Mobile & Ohio.—3½ per cent, semi-annually; 3 per cent extra, both payable December 30 to holders of record December 23.

New York Central.—1¾ per cent, quarterly, payable February 1 to holders of record December 31.

Northern Pacific.—\$1.25, quarterly, payable February 1 to holders of record December 31.

Philadelphia & Trenton.—2½ per cent, quarterly, payable January 10 to holders of record January 1.

Pittsburgh & Lake Erie.—Common, \$2.50, semi-annually; common, \$5.00, extra, both payable February 1 to holders of record January 17.

Seaboard Air Line.—2½ per cent, semi-annually, payable February 1.

Southern.—Common, 1¾ per cent, quarterly, payable February 1 to holders of record January 10. Preferred, 1¼ per cent, quarterly, payable January 15 to holders of record January 3.

Toronto, Hamilton & Buffalo.—3 per cent, semi-annually, payable December 31 to holders of record December 27.

PLANS BEING considered by Congress for the purchase of land for additional government buildings in Washington may require the Southern to find a new location for its general offices, now in the company's building at Thirteenth street and Pennsylvania, where there are 2,200 employees. This has caused talk of the removal of the offices to some other city and committees representing various associations of business men have conferred with President Fairfax Harrison to consider ways of avoiding such a move, but Mr. Harrison has stated that the company would reach no decision until actually notified that the property is required by the government.

Railway Officers

Executive

Miers Busch has been elected president of the Wyandotte Southern, with headquarters at Philadelphia, Pa., succeeding **Dr. Fales Baker**.

L. C. Sprague, general manager of the Uintah, with headquarters at Mack, Colo., has been elected vice-president, with the same headquarters.

J. H. Hustis, Jr., superintendent of property protection of the New York Central Railroad and the Ottawa & New York, with headquarters at New York City, has been appointed assistant to the vice-president.

Charles E. Denny, vice-president and general manager of the New York, Chicago & St. Louis with jurisdiction over the Nickel Plate and Lake Erie & Western districts,

with headquarters at Cleveland, Ohio, has been elected senior vice-president, and his jurisdiction extended over the Clover Leaf district. Mr. Denny was born in Washington, D. C., in 1879, and received his education at the Pennsylvania State College. After six years' service with the Union Switch & Signal Company, he entered railway service on May 16, 1905, as assistant signal engineer on the Lake Shore & Michigan Southern (now a part of the New York Central), and from



C. E. Denny

May, 1906, to September, 1913, he was signal engineer, his jurisdiction being extended on May 16, 1912, to include the Lake Erie & Western. From 1913 until August, 1914, he was special engineer to the vice-president of the New York Central Lines, with headquarters at Chicago. At the latter time he was appointed assistant general sales manager of the Union Switch & Signal Company, and prior to November, 1916, was successively assistant general manager and assistant to the president. On the latter date he was appointed assistant to the president of the New York, Chicago & St. Louis, and was later promoted to assistant general manager, and then to assistant federal manager, which position he held until March 1, 1920, when he was elected vice-president and general manager.

M. E. Singleton has been elected president of the Utah Idaho Central, **A. B. Apperson** has been elected executive vice-president and **Joseph Scowcroft** has been elected vice-president. All will have headquarters at Ogden, Utah.

L. O. Head, assistant to the vice-president, Western departments, of the American Railway Express, with headquarters at San Francisco, Cal., has been appointed vice-president in charge of operations, Western departments, with the same headquarters, effective January 1, 1927, succeeding **Andrew Christeson**, who will retire from active service on that date. Mr. Head was born in Georgia on April 23, 1879, and entered the service of Wells Fargo & Company Express in November, 1898, at Dublin, Tex. He was consecutively agent, route agent and chief route agent, and on October 1, 1909, was appointed general agent at New Orleans, where he remained until August 1, 1911, when he was appointed superintendent of the Arkansas division at Little Rock, Ark.

He then served successively as efficiency superintendent, general superintendent and assistant to the vice-president. On July 1, 1918, when all of the old express companies were consolidated into the American Railway Express Company, Mr. Head was appointed assistant to the vice-president, Western departments, of the American Railway Express, which position he was holding at the time of his recent appointment as vice-president in charge of operations.

G. T. Atkins, freight traffic manager of the Missouri-Kansas-Texas, with headquarters at St. Louis, Mo., has been elected vice-president in charge of traffic, to succeed **Columbus Haile**, promoted to the presidency. Mr. Atkins was born on August 13, 1878, at Petersburg, Va., and entered railway service in 1897 as a messenger in the auditor's office of the Texas & Pacific at Dallas, Tex., after which he held various clerical positions in the auditor's office of the Missouri-Kansas-Texas. He was transferred to the general freight office of the same road, and served successively as file clerk, rate clerk and chief rate clerk. On March 1, 1906, he was promoted to commercial agent of the same road at Dallas, Tex., and on October 1, 1906, he became chief clerk in the general freight office. On June 1, 1910, he was summoned to Shreveport, La., to serve as freight traffic manager for the Chamber of Commerce, and on July 1, 1918, he became traffic assistant, Division of Public Service and Accounting, United States Railroad Administration at Washington, D. C. He became assistant director of the Division of Public Service on February 1, 1919, and on March 1, 1920, freight traffic manager of the Missouri-Kansas-Texas, which position he was holding at the time of his recent election.



G. T. Atkins

Financial, Legal and Accounting

George Becker, auditor of receipts of the Louisville & Nashville, with headquarters at Louisville, Ky., retired on November 30, after 39 continuous years in the service of that company.

Herbert V. Clemens, auditor of freight receipts of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., has been appointed assistant general auditor in charge of the revenue accounting departments. **A. A. Drummond**, assistant auditor of freight receipts, with headquarters at New Haven, has been appointed auditor of freight receipts.

Operating

Carl L. Jellinghaus has been appointed superintendent of property protection of the New York Central Railroad and the Ottawa & New York, with headquarters at New York City, succeeding **J. H. Hustis, Jr.**, promoted.

G. N. Wagner, assistant chief clerk in the office of the general superintendent of transportation on the Pennsylvania at Chicago, has been promoted to supervisor of mail and express service of the Western region with the same headquarters.

B. T. Corker has been appointed terminal trainmaster of the Hinton terminal of the Chesapeake & Ohio, with headquarters at Hinton, W. Va. **F. W. Myers** has been appointed trainmaster of the New River Coal sub-division, with head-

quarters at Thurmond, W. Va., succeeding Mr. Corker, and **W. W. Atkins** has been appointed trainmaster of the Logan Coal sub-divisions, with headquarters at Peach Creek, W. Va., succeeding Mr. Myers. **L. J. Mahle** has been appointed assistant trainmaster of the Logan Coal sub-divisions, with headquarters at Peach Creek, succeeding Mr. Atkins. **G. P. Gibbs** has been appointed trainmaster of the Handley Coal sub-divisions, with headquarters at Handley, W. Va., succeeding **E. J. Lilly**, who has been transferred to succeed Mr. Gibbs as trainmaster of the Big Sandy division, with headquarters at Ashland, Ky.

Traffic

Warren K. Cundiff, who has been promoted to general passenger agent of the Oregon-Washington Railroad & Navigation Company, with headquarters at Portland, Ore., was born on October 19, 1868, at St. Joseph, Mo., and entered railway service in 1881 as a clerk on the Missouri Pacific at St. Louis, Mo. In 1883 he left this railroad to become connected with the St. Joseph & Grand Island, with headquarters at St. Joseph, where he served in various capacities, including that of chief clerk in the passenger department until June, 1902. He was then appointed bureau agent of the Trans-Missouri Exchange Scrip Bureau at Omaha, Neb., and four years later he was appointed clerk in the rate bureau of the Union Pacific at the same place. He advanced successively to chief rate clerk and chief clerk and on January 15, 1911, he was promoted to assistant general passenger agent. On May 1, 1913, he was transferred to Kansas City, Mo. Mr. Cundiff was transferred to Denver, Colo., on August 1, 1916, where he remained until his promotion to general passenger agent.



Warren K. Cundiff

J. C. Wyche has been appointed freight agent of the Central of Georgia, with headquarters at Macon, Ga.

J. J. Forster, general agent of the Canadian Pacific at Vancouver, B. C., has been appointed steamship general passenger agent, with the same headquarters, effective January 1, 1927.

The item to the effect that **G. R. Olliphant, Jr.**, had been appointed general agent for the Missouri Pacific in Cuba is incorrect in that he represents the Mobile & Ohio in Cuba, with headquarters at Havana.

Joseph R. O'Malia has been appointed general agent in the freight department of the New York Central, with headquarters at St. Paul, Minn., succeeding **H. R. Ballard**, retired under the pension rules of the company.

G. C. Hittel, traveling freight agent on the Chicago, Milwaukee & St. Paul, with headquarters at Milwaukee, Wis., has been promoted to general agent, with headquarters at Atlanta, Ga., a newly established office.

William A. Wilson, who has been employed in the office of the president of the Chicago, Rock Island & Pacific, has been appointed commercial agent of the Buffalo, Rochester & Pittsburgh, with headquarters at Chicago.

Wills J. Carter has been appointed division freight and passenger agent of the Southern Pacific-Texas lines, with headquarters at Harlingen, Tex. **H. C. Franks** has been

appointed division freight and passenger agent at Galveston, Tex., succeeding Mr. Carter.

Claude H. Goodhue, supervisor of express traffic on the Northern Pacific, with headquarters at Seattle, Wash., has been promoted to manager of mail, express and baggage traffic, with headquarters at St. Paul, Minn., effective January 1, succeeding **Dan C. Pettibone**, deceased.

Charles J. Collins, who has been promoted to general passenger agent of the Union Pacific, with headquarters at Omaha, Neb., succeeding **Wilson H. Murray**, who retires on



C. J. Collins

January 1, 1927, was born at Columbus, Ohio. He entered railway service in 1907 as a ticket seller at the Union station at Columbus and in 1909 was appointed assistant ticket agent on the Pennsylvania at the same point. The following year he was promoted to city passenger agent and in 1913 he first became connected with the Union Pacific as traveling agent, with headquarters at Cincinnati, Ohio. In 1917 he was appointed Chicago representative of the department of

tours maintained by the Union Pacific and the Chicago & North Western. Mr. Collins was promoted to manager of the department of tours in 1920. In April, 1926, he was again promoted to general passenger agent of the Oregon-Washington Railroad & Navigation Company, with headquarters at Portland, Ore., a position he will hold until his promotion to general passenger agent of the Union Pacific, effective January 1.

Lloyd E. Omer, who has been promoted to assistant general passenger agent on the Union Pacific, with headquarters at Omaha, Neb., effective on January 1, 1927, entered railway service in 1901 as assistant agent and operator on the Wabash at Clayton, Ill. In 1905 he was appointed an operator on the Minneapolis, St. Paul & Sault Ste. Marie, serving in this position and as agent and cashier at Apollonia, Wis., and Bruce until 1908. He was then appointed operator and cashier on the Spokane & Inland Empire at Rosalia, Wash. Later he was transferred to Moscow, Idaho, and in the next year he became connected with the Great Northern at Spokane,



L. E. Omer

Wash. In 1913 Mr. Omer was appointed a clerk in the accounting department of the Union Pacific at Portland, Ore. He served in various other capacities in the general passenger office at Portland until 1916 when he was promoted to traveling freight agent at Spokane and the same year he was appointed traveling freight and passenger agent, with headquarters at Calgary, Alta. Mr. Omer was transferred to Walla Walla, Wash., in 1917 and in 1918 was appointed city passenger agent at Portland, a position he will hold until his promotion to assistant general passenger agent becomes effective on January 1.

Dixie Hannibal, division freight agent on the Missouri Pacific, with headquarters at El Dorado, Ark., has been promoted to general agent, with headquarters at Shreveport, La., succeeding **L. D. Nicholson**, promoted to assistant general freight agent, with headquarters at Memphis, Tenn.

G. H. Clark, assistant general freight agent of the New York Central Railroad, with headquarters at New York, has been appointed assistant to the traffic manager of that road



G. H. Clark

and the West Shore, with the same headquarters. Mr. Clark was born on February 7, 1878, at Brooklyn, N. Y., and was educated in the public and high schools. He entered railway service on January 1, 1900, with the Merchants Despatch (New York Central fast freight lines), with headquarters at New York. On June 8, 1904, Mr. Clark was appointed contracting freight agent, and on March 15, 1905, became chief clerk to the general eastern freight agent, in which capacity he served un-

til November 1, 1911, when he was appointed division freight agent at Utica, N. Y. The following year he was appointed general freight and passenger agent of the Ottawa & New York (now the New York Central), with headquarters at Ottawa, Ont. In April, 1916, when the Ottawa & New York was taken over by the New York Central, Mr. Clark was appointed division freight and passenger agent at Ottawa, and in January 16, 1922, he was appointed division freight agent with headquarters at New York. In December, 1923, he was appointed assistant general freight agent, which position he was holding at the time of his recent appointment as assistant to the traffic manager.

J. A. Brown, freight traffic manager of the Gulf Coast, the International-Great Northern and the San Antonio, Uvalde & Gulf and general freight agent of the Houston & Brazos



J. A. Brown

Valley, with headquarters at Houston, Tex., has been appointed assistant vice-president of the Missouri Pacific in charge of traffic on the Texas lines, with headquarters at St. Louis, Mo., effective January 1, 1927. Mr. Brown was born on January 31, 1874, at Tampa, Fla., and attended the University of Texas, Austin, Tex., entering railway service on August 3, 1896, in the treasury department of the Missouri-Kansas-Texas. In June, 1897, he was employed as a stenographer in the

general freight office of the International & Great Northern, later occupying the position of rate clerk until June, 1903. At that time he was promoted to commercial agent at Dallas, Tex., and four years later he was appointed chief clerk in the general freight office of the Gulf Coast at Beaumont, Tex. In January, 1910, and for the two years following he served as assistant general freight agent on the Trinity & Brazos Valley, with headquarters at Houston. He was then appointed general freight agent of the Gulf Coast Lines

which included the Beaumont, Sour Lake and Western, the Louisiana Southern, the New Iberia & Northern, the New Orleans, Texas & Mexico, the Orange & Northwestern and the St. Louis, Brownsville & Mexico. Mr. Brown remained with this company through its receivership and upon its reorganization in 1916 he was placed in charge of the freight traffic department. For six months during federal control he served as general freight agent on the Ft. Worth & Denver, the Houston & Texas Central, the Texas lines of the St. Louis-San Francisco and the International-Great Northern, returning to the Gulf Coast Lines as general freight agent and later as freight traffic manager in 1919. He occupied this position until his promotion to assistant vice-president.

Engineering, Maintenance of Way and Signaling

P. M. Gault, assistant signal engineer on the Illinois Central, with headquarters at Chicago, has been appointed signal engineer of the Missouri Pacific, with headquarters at St. Louis, Mo., effective January 1, succeeding **B. H. Mann**, appointed consulting signal engineer. Mr. Gault was born at Waverly, Kan., in 1884 and was graduated from Ohio State University, Columbus, Ohio, in electrical engineering in 1906. He entered railway service in the same year as a signal apprentice on the Pennsylvania, Lines West, and worked in various capacities in the maintenance and construction of automatic signals and mechanical and electric interlocking plants until April 1, 1909, when he was transferred to the signal engineer's office as a draftsman. At the end of four years' apprenticeship he was transferred to the Chicago terminal on automatic signal construction and in January, 1911, he was promoted to division signal inspector at the Chicago terminal. On April 1, 1913, he left the Pennsylvania to become supervisor of signals of the Illinois division of the Illinois Central and the following year he was appointed signal inspector in the office of the signal engineer at Chicago. Mr. Gault was promoted to office engineer on January 15, 1915, being assigned as a pilot signal engineer on valuation work in October, 1917. He returned to the signal department as office engineer on the completion of this work and in January, 1923, he was promoted to assistant signal engineer, with headquarters at Chicago, a position he held until his resignation to become signal engineer of the Missouri Pacific. Mr. Mann was born on November 15, 1866, at Weymouth, Mass., being graduated from the Massachusetts Institute of Technology, Boston, Mass., in electrical engineering in 1890. He entered railway service in July, 1883, as a telegraph operator on the Old Colony, later serving as a station agent until 1886 when he entered the train service. From 1890 to 1891 he was em-



P. M. Gault



B. H. Mann

ployed by the Union Switch & Signal Company and he was then appointed superintendent of signals of the Cincinnati, New Orleans & Texas Pacific. In 1898 he became supervisor of interlocking of the Boston Terminal Company and the following year he was appointed signal engineer of the Chicago & Alton. Mr. Mann was appointed signal engineer of the Missouri Pacific in 1903, with headquarters at St. Louis, a position he has held continuously for 23 years until his appointment as consulting signal engineer.

B. W. Molis, office engineer in the district assistant signal engineer's office of the Chicago, Rock Island & Pacific at Des Moines, Iowa, has been appointed signal engineer of the Denver & Rio Grande Western, with headquarters at Denver, Col.

Robert Trimble, assistant chief engineer of the Pennsylvania, with headquarters at Pittsburgh, Pa., will retire on December 31. On July 1 of this year Mr. Trimble was appointed chief engineer of the Pennsylvania Company and the Pittsburgh, Cincinnati, Chicago & St. Louis, and a photograph and a biographical sketch of his railway career appeared in the *Railway Age* of July 10, page 80.

Mechanical

A. G. Sandman, mechanical engineer of the Baltimore & Ohio, with headquarters at Baltimore, Md., has been promoted to assistant to the chief of motive power, with the same headquarters. Mr. Sandman was born on October 19, 1862, in Germany, and was educated in the public schools of Maryland and at Maryland Institute. He entered railway service with the Baltimore & Ohio as machinist apprentice on October 7, 1879, becoming machinist in 1883. In 1888 he became draftsman and was promoted to chief draftsman in 1901. He became mechanical engineer on July 16, 1918, which position he was holding at the time of his recent promotion. **W. B. Whitsitt**, assistant mechanical engineer at Baltimore, has been promoted to mechanical engineer succeeding Mr. Sandman.

Obituary

Roberts Walker, at one time general counsel for the Rock Island Lines and a member of the legal firm of White & Case, died on December 22, at his home in Scarsdale, N. Y. Mr. Walker was born on August 24, 1874, in Rutland, Vt., and was graduated from Amherst in 1896. He entered railway service in 1904 as assistant to the counsel of the Rock Island Lines. In January, 1910, he became general counsel of the system and chairman of the executive committee. Mr. Walker served as president and director of the Rock Island Company; president and director of the Chicago, Rock Island & Pacific Railroad Company of Iowa; vice-president and director of the Chicago, Rock Island & Pacific Railway Company, and also served in similar capacities on various railroads and in several companies.

J. L. McCollum, at one time superintendent of the Atlanta division of the Nashville, Chattanooga & St. Louis, died on December 8 in Atlanta, Ga. Mr. McCollum was born on May 10, 1842, in Dade County, Ga., and after serving in the Civil War, entered the service of the Wills Valley in May, 1866, and in a few months was appointed agent at Chattanooga. In 1867 the Wills Valley was purchased and extended as the Alabama & Chattanooga (now a part of the Alabama Great Southern). He was then appointed superintendent and later master of transportation. In July, 1871, he resigned and entered the service of the Nashville & Chattanooga (now the Nashville, Chattanooga & St. Louis) and served in various capacities. In 1875 he was appointed general agent at Chattanooga, retaining also the duties of trainmaster. He remained there until the Western & Atlantic was taken over by the Nashville, Chattanooga & St. Louis on December 27, 1890, at which time he was transferred to Atlanta as superintendent and he was the active head of this property for over 25 years. In 1915 he was made general agent of the operating department on the staff of the president. Major McCollum was recently elected president of the "Old Guard," the veterans' association of officers and employees. He was the oldest officer in the road's service.

Railway Age

Motor Transport Section

Devoted to the
Co-ordination of Railway and Highway Service

Vol. 81, No. 20

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Page 61, of Advertising Section

The Proposed Motor Transport Division, A.R.A.

THE proposal to affiliate the Railroad Motor Transport Conference with the American Railway Association, which was approved by the conference at its recent meeting at Chicago, is a step in the right direction. From the standpoint of the motor transport conference such affiliation is desirable for several reasons. As a part of the American Railway Association, an official aspect will be lent its work which would be lacking if the conference were to continue as an independent body. Such an official nature is desirable on account of the likelihood that it will assist the conference to grow in numbers and influence. The American Railway Association should be glad to welcome the Motor Transport Conference. The steadily growing adoption and operation of motor buses, trucks and rail motor cars by the railways has already made motor transport an important part of the business of railway transportation. The Railroad Motor Transport Conference belongs within the American Railway Association. The proposal to affiliate contemplates that it should not be made a part of a division already in existence, but should be a division in itself.

The B. & M. Plan of Bus Maintenance

RAILWAYS now engaged or soon to enter upon bus operation will find much of interest and value in the description of the bus maintenance practices of the Boston & Maine, which is published in this issue of the Motor Transport Section. A careful study of it will be well repaid. The history of the Boston & Maine in the field of bus operation is typical of that of every other railway. Since the beginning, when only a few buses were operated, its system of bus lines has grown steadily and rapidly. So rapid has been its expansion, in fact, that the maintenance department has had the greatest difficulty in keeping pace with the operating department. Many make-shifts have had to be utilized—make-shifts which other railways newly engaging in bus operation will probably have to adopt temporarily. For example, the Boston & Maine Transportation Company has been compelled to maintain some of its buses in privately owned garages in spite of the expense and unsatisfactory character of this system. Other railways, like the Boston & Maine, may be forced by circumstances to adopt this same method, but they should also be like the Boston & Maine in their intention to change this as soon as possible. Operating at this time 61 motor buses, the Boston & Maine Transportation Company is neither a large bus company nor a small one. Its bus maintenance facilities are neither so highly developed as those, for example,

of the New England Transportation Company, nor so make-shifts as those of many smaller companies. Rather, its maintenance methods are typical of those of a railway bus company of average size, a size which will be about that of most other railway bus companies in the earlier stages of the development of railroad motor transport. A description of these maintenance methods, therefore, should be of more than ordinary interest and value.

Motor Trucks Save Money and Improve Service

THE motor truck is now, and rightly, an important part of the rolling stock of a number of railways. Its virtues lie in its economy in operation, and its ability to render a kind of service that the railways cannot provide with trains. Used in terminals, it can materially lessen congestion and reduce operating expenses. In making line-hauls of l.c.l. freight it can release the main line tracks for the most profitable traffic, the through traffic. The prediction is freely made—it was made by President T. C. Powell, of the Chicago & Eastern Illinois, at the dinner of the Railroad Motor Transport Conference in Chicago, on December 1—that the truck will ultimately be used to make railroad transportation service complete, by providing store door collection and delivery. This is already being done in some cases. The Motor Transport Conference devoted the larger part of its meeting at Chicago to railroad motor truck operation. The knowledge of what the motor truck can do for the railways was thus brought home to those present, who represented, incidentally, more than 55 per cent of the Class I railway mileage in the United States.

The Motor Transport Conference Hits Its Stride

THE Railroad Motor Transport Conference now is ready to go ahead. The road is clear and the rough spots have been smoothed out. This condition is the result of months of hard, conscientious work on the part of the executive committee. The story of the difficulties, the differences of opinion, that beset the conference and endangered its success, if not its very existence, will never be fully told. It need not be told, now that these obstacles seem to have been swept away. The meeting at Chicago on December 1 and 2 was the first regular meeting of the conference. Those that had preceded it—the one at Atlantic City in June and that at Providence and Boston in August—were preliminary organization meetings. With a first regular meeting, a highly successful one in point of attendance and keen interest of the members present, behind it, the conference should hit its stride and go ahead rapidly. It has

a good organization—strong and able men as its officers and a wise subdivision of the work into three groups, bus, truck and rail motor car. It has taken the inevitable and commendable step of proposing affiliation with the American Railway Association. The desirability of this, from the standpoint of the added prestige and influence of the conference, is obvious. The next meeting is scheduled to be held in April in what may fairly be considered the birthplace of motor transportation—California. That meeting should be worth a transcontinental journey to representatives of any railway. Much credit is due the officers and members of the conference for the progress they have made in the six months since its inception. A continuation of the hard work that they have done will assure the future success of the conference and will aid greatly in the advancement of the motor transportation activities of the railways.

The Contest for Certificates

THE longer the railways, which are looking favorably upon bus operation, delay their entrance into the field, the greater difficulty they will have in being permitted to do so. The scramble for certificates of convenience and necessity before state public utility commissions which regulate buses is becoming more and more intense, as independent operators, electric railways and steam railways contest for the privilege of monopoly on the more promising routes. The certainty of a competitor entering the field if it did not do so was a principal reason for the Norfolk Southern's application for a certificate to operate over the shore line route from Norfolk, Va., to Virginia Beach and its present operation of buses over this route. If it had delayed its action, it would have had either to buy out the potential competitor at a later date or refrain from supplementing its rail service. So will other railways in all parts of the country if they remain inactive indefinitely. Competitors can usually be bought out, but the price to be paid is also usually high. While the railways are making sure whether they ought to expand to the highways by means of lengthy investigations and studies, this factor of competition for bus operating certificates should not be overlooked. This is not to say that precipitate action is required, but it is to say that too protracted delay may be extremely costly.

The Same Old Story

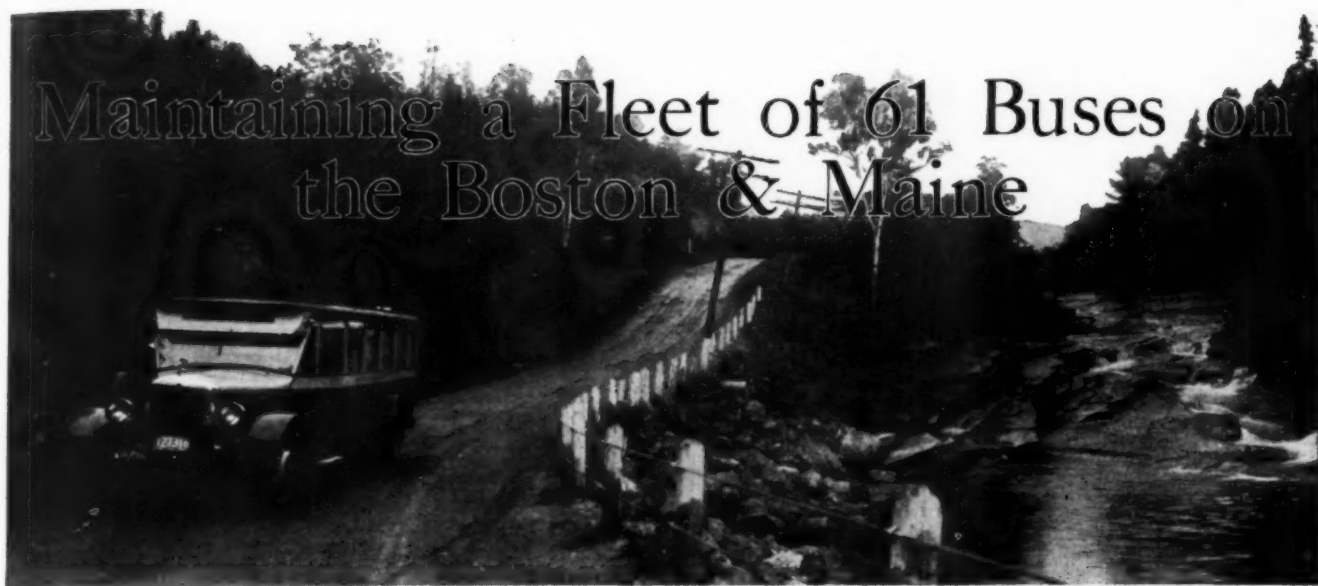
OCASIONS frequently arise in the railroad business when the roads are severely taken to task in public for not doing a thing and as strongly condemned when they try to do it. Such an instance has arisen in the expansion of the railways to the highways by the operation of buses and trucks supplementing their rail service. Vocally and in writing the railways have been severely chided for their past lack of interest or their procrastination in adopting the bus and truck. This has been pointed out on innumerable occasions as an example of railroad conservatism. Then when several of the railways have proposed to establish bus lines supplementing their railway lines, they have been met by charges that they are seeking to establish a monopoly of the transportation business by smothering the existing independent carriers. To the credit of the foresight of most of the state regulatory commissions having the power to refuse or grant certificates of public convenience and necessity to highway carriers, it can be said that they have shown a gratifying attitude of helpfulness to the

railways in their proposals to expand and better their service by operating on the highways. In Pennsylvania, however, the situation is different. After months of waiting the Reading, which long ago proposed to establish an elaborate system of bus lines supplementary to its railway lines, is still in doubt as to the granting of the larger part of its program and the Pennsylvania, with similar plans has secured authority to operate only two short lines. More recently the Baltimore & Ohio has met the same opposition to its plan to supplement its rail service with buses in West Virginia. It is perhaps true that the railways in these instances are paying the price of being the last to enter the highway transportation field. But the railways can, and in increasing numbers they propose to, operate highway transportation lines of greater efficiency and value to the public than anyone else can provide, since they propose to co-ordinate their highway service with their railway service and only from such co-ordination can the most adequate and efficient transportation evolve. It is hardly to be expected that the railways in cases such as those mentioned will be prevented indefinitely from operating on the highways. Where decreased operating costs and the creation of new business through the provision of better service are attainable the railways will ultimately be compensated for the trouble they now encounter.

The Detroit-Toledo Rate War

WHEN bus lines engage in rate wars, they do it properly. A cut rate to them is a real cut rate; they don't shave, they slice and chop. For example, we have the rate war of bus lines operating between Detroit, Mich., and Toledo, Ohio. The distance by road between these cities is about 55 miles. The railroad fare is \$2.08 one way, but the bus lines—there are three—established a rate of \$1.75 for a one way trip when they began to operate. Even this was a low fare—less than three cents a mile—but it was not low enough, apparently, to satisfy the three bus lines' desire for heavy business. So they started to cut rates. First, one made the one way rate 75 cents. Then another made it 45 cents one way and 65 cents round trip. The first countered with a rate of 30 cents one way and 50 cents round trip. This was forthwith cut to 20 cents one way, or about a third of a cent a mile. This became a little too impoverishing after a while in spite of record-breaking business and a rate of 75 cents one way was again put into effect—without notice. But this did not last long, one line lowering its fare to 50 cents again. Doubtless all these reductions were amusing to the patrons, but it can scarcely have impressed them with an admiring regard for the business sense and likelihood of stability of these bus lines. The rate war brought the lines nothing except losses—and perhaps a few headaches. It did no one any real good and probably did a good deal of harm, not only to these lines themselves, but to bus transportation in general. Such a thing could not happen under a proper system of regulation. Being interstate carriers these Detroit-Toledo lines are accountable to no one. Ridiculous, damaging rate wars of this sort will continue as long as there is no regulation of interstate highway carriers. The railways, of course, can be expected to lose no sleep over occurrences of this sort. They are one sure way of eliminating bus competition. But being themselves operators or prospective operators of buses, they should regard any such rate reductions as damaging to themselves. A public opinion that bus lines can operate successfully on a charge of one-third of a cent a mile would do them no good, to say the least.

Maintaining a Fleet of 61 Buses on the Boston & Maine



DURING 1926 the Boston & Maine Transportation Company, the bus operating subsidiary of the Boston & Maine, has increased its fleet of buses until it now has 61 in operation in Massachusetts, New Hampshire and Maine. During the peak of the season these buses operate over 17 routes which cover a total of 599 route-miles. The accompanying table, which covers a period of five months for 56 buses, shows the bus-miles made in regular and special service.

This fleet of 61 buses is serviced at garages located at Greenfield, Mass., Manchester, N. H., Portsmouth,

located at Portsmouth or Boston. Five buses are serviced at Manchester and the remaining 50 are equally



One of the Steel Stock Sections Located at the Boston Garage

N. H., and Boston, Mass. At Greenfield six buses are serviced at a private garage by mechanics not employed by the transportation company. When these buses need heavy repairs, they are routed to the company's garage



Two Buses on the Ramp Located at the Portsmouth, N. H., Garage

divided between the garages located at Portsmouth and Boston.

Facilities at Boston

The Boston garage, which is not owned by the company, contains a ground floor area of 20,000 sq. ft. One corner of it has been set aside as a combination stores department, toolroom and office. The toolroom, besides containing the usual line of tools necessary for motor car maintenance, is equipped with a Manley brake lining and riveting machine, oxyacetylene equipment for welding and brazing and a high-pressure grease gun. A system of brass tool checks is being installed at this point. The force consists of one foreman, four mechanics, three helpers, one bodyman and his helper,

The Portsmouth garage, owned by the Transportation Company, was formerly a car barn which has been

[illegible]

equipped for bus repair work. It has a floor area of approximately 20,000 sq. ft. A ramp near the machine shop has been built which will hold two coaches. The ramp and the machine shop are served by an overhead

<div style="display: flex; justify-content: space-between;"> FILE NO. _____ DATE _____ </div> <div style="text-align: center;"> BOSTON & MAINE TRANSPORTATION CO. Couch Report Card </div>		RECORD OF DELAYS <small>DELAYS FOR WHICH AN EXPLANATION IS REQUIRED</small>	
GAS CONSUMPTION <small>THIS CARD NEEDS BE FILLD UPN EACHED AND DATE</small>		DATE <div style="border: 1px solid black; height: 20px; width: 100%;"></div>	TIME <div style="border: 1px solid black; height: 20px; width: 100%;"></div>
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<small> Every driver and chauffeur should make details as to any abnormal action. If no defect appears, mark "OK" in Driver Column. Also show starting point and miles in column provided therefor. For repairs, mark "OK" in Defect, with brief notes as to kind, nature and location of defect. For fuel, mark "OK" in Fuel, with brief notes as to kind, nature and location of defect. </small>			
BRAKE DEFECTS MADE A SPECIAL REPORT YOU WANT REMOVED			
<small>THIS CARD IS TO BE COMPLETED BY THE DRIVER</small>			
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monorail trolley on which run five chain hoists. With the aid of four of these hoists a coach body can be lifted from its chassis and indefinitely suspended over head. In

Two lathes, a vertical drilling machine, a small planer, a double-end grinder, a valve facer, a power hack saw, a brake lining machine and equipment for oxyacetylene welding are available at this garage. It is also provided with an air compressor and is the only one of the five garages with facilities for charging batteries. The employees at the Portsmouth garage consist of a foreman, four mechanics, a helper, a stockman, and two men on

FORM B & M T-7 B

TIME CARD

START	FINISH
--------------	---------------

GARAGE NAME _____

EMPLOYEES NAME _____ **No.** _____

COACH No. _____

UNIT No. _____

WORK DONE	ACCOUNT NO.
------------------	--------------------

CONTINUE RECORD ON BACK

RATE _____

TOTAL TIME _____

LABOR COST _____

APPROVED _____

FOREMAN

the night trick who clean the coaches and make minor repairs.

Ten coaches are kept in a public garage at Manchester which is rented on a basis of so much per car per month. On September 27, 1926, the Transportation Company took over the garage of the Interstate Stage Line which garage has a floor space of approximately 5,000 sq. ft. At the present time five buses are housed in this garage. It is planned to take care, in this garage, of the ten

coaches now stored in the public garage. A foreman and three mechanics, two on the day trick and one on the night trick, do all of the repair work. As yet no special tools have been installed at this garage.

The six coaches which are serviced at Greenfield are cared for at a public garage and no B. & M. employees are located at this point.

Maintenance Methods

All buses arriving at a garage at the end of their runs are repaired according to the defects reported on the coach report card shown in one of the illustrations. The operator lists on this card all defects which he notices during his tour of duty. Special attention is paid to brake defects and the speed governor, which is set so

Repairs to bodies are made only at the Boston garage, but plans have been made to provide for similar work at Portsmouth and Manchester. Owing to the newness of most of the coaches, no general painting has been necessary, but a plan has been worked out whereby all coaches will be spray painted in the company's garages.

The oil in the bus motors is changed every 1,000 to 2,000 miles. Certain parts of the buses are greased after each day's operation, the remainder being greased every 1,000 miles.

Inspection and Forms Used

All buses receive a general inspection every 2,000 miles. The time each bus is due for a general inspection

BOSTON & MAINE TRANSPORTATION CO. GENERAL INSPECTION SHEET					
DIVISION		COACH No. _____ TYPE _____		INSPECTION DATE _____	
NAME OF REGULAR DRIVER _____	BAUGE No. _____	INFORMATION FOR DATE ENDING _____	INSPECTION DATE _____		
TOUR OF INSPECTION	WORK DONE BY	CONDITION AFTER COMPLETION	DATE	REPORTS COPIED FROM COACH REPORT CARDS SHOW MECHANICAL DELAYS IN RED INK	REPAIRED BY
GENERAL INSPECTION SHEET FOR ALL COACHES					
1. EXHAUSTOR AND BURNER					
a. Examine radiator for leaks.					
b. Examine radiator water holding down studs.					
c. Examine radiator shell holding down studs.					
d. Examine radiator filler cap.					
e. Examine belt-tensioner and adjuster band idler.					
f. Examine burner catches.					
g. Examine radiator fan belt from dash to radiator.					
2. ENGINE					
a. Run engine and examine for leaks.					
b. Examine water pump connections.					
c. Examine fan belt.					
d. Drain crank case and clean oil filter screen.					
e. Refill with new oil.					
f. Clean exhaust ports or adjust valve tappets.					
g. Examine engine holding down bolts.					
h. Test compression.					
i. Examine fan belt and grease fan.					
j. Examine exhaust pipes.					
k. Examine air conditioning valve.					
l. Examine air regulator valve, clean or replace belt in clutch.					
m. Examine valves and seats in air compressor head.					
3. IGNITION					
a. Thoroughly clean distributor.					
b. Examine breaker points for adjustment.					
c. Oil distributor.					
d. Examine that wires are in good order.					
e. See that lead wire tube is insulated from engine.					
f. Examine and clean spark plugs and adjust points.					
g. Examine timing switch and wires.					
4. CARBURETOR					
a. Examine all caps and clean wells.					
b. Examine float and float weights.					
c. See that all floats and jets are tight on needle.					
d. See that throttle pin is in good order.					
e. Clean carburetor from dirt and see that it has good circulation.					
f. Examine pull back spring on throttle rod.					
g. Examine accelerator cable.					
h. Examine gas tank and gas line for leaks and drain sediment level of gas tank.					
i. See that gas line is held firm by clips and is not rubbing.					
5. CLUTCH					
a. Examine clutch lining through inspection hole.					
b. See that fingers are properly adjusted.					
c. Grease clutch spindle.					
d. Grease clutch throwout race.					
e. Examine throwout bearing on clutch throwout.					
f. Examine (clutch) disc and bolts.					
6. TRANSMISSION					
a. Examine for leaks.					
b. Examine for oil leaks.					
c. Examine for oil leaks.					
d. Examine clutch linkage for tilt and oil leak.					
e. Examine clutch linkage and see that it is adjusted properly.					
f. Examine inspection hole on ball bearing.					
7. CHANGE SPEED CONTROL MECHANISM					
a. Examine for leaks.					
b. See that all gears properly mesh.					
c. See that all shafts and that bearings are in good condition.					
d. See that all connecting points are lubricated with engine oil.					
e. Examine hand brake lever and cable.					
8. REAR PROPELLER SHAFT					
a. See that all bolts are tight and no undue play and joints are properly lubricated.					
9. REAR AXLE AND BRAKES					
a. Check on both sides, see if wheels true freely.					
b. Test for and play or tilt in wheel bearings.					
c. Examine brake lining for wear.					
d. Examine brake lining for wear.					
e. Grease wheel axle and grease rear axle shaft bearings.					
f. Examine drum. See that there are in good condition and have not less than 3/16 in. air pressure.					
g. See that wheels are tight on axles.					
h. Oil with oil case oil brake steering pins.					
i. Examine on both sides for leaks and see if they are tight.					
j. Examine on both sides for leaks and see if they are tight.					
k. Examine on both sides for leaks and see if they are tight.					
l. Examine on both sides for leaks and see if they are tight.					
m. Examine on both sides for leaks and see if they are tight.					
n. Examine on both sides for leaks and see if they are tight.					
o. Examine on both sides for leaks and see if they are tight.					
p. Examine on both sides for leaks and see if they are tight.					
q. Examine on both sides for leaks and see if they are tight.					
r. Examine on both sides for leaks and see if they are tight.					
s. Examine on both sides for leaks and see if they are tight.					
t. Examine on both sides for leaks and see if they are tight.					
u. Examine on both sides for leaks and see if they are tight.					
v. Examine on both sides for leaks and see if they are tight.					
w. Examine on both sides for leaks and see if they are tight.					
x. Examine on both sides for leaks and see if they are tight.					
y. Examine on both sides for leaks and see if they are tight.					
z. Examine on both sides for leaks and see if they are tight.					
10. FRONT AXLE, STEERING AND FRONT SPRING					
a. See that front spring ends are tight.					
b. See that front spring ends are tight.					
c. See that front spring ends are tight.					
d. See that front spring ends are tight.					
e. See that front spring ends are tight.					
f. See that front spring ends are tight.					
g. See that front spring ends are tight.					
h. See that front spring ends are tight.					
i. See that front spring ends are tight.					
j. See that front spring ends are tight.					
k. See that front spring ends are tight.					
l. See that front spring ends are tight.					
m. See that front spring ends are tight.					
n. See that front spring ends are tight.					
o. See that front spring ends are tight.					
p. See that front spring ends are tight.					
q. See that front spring ends are tight.					
r. See that front spring ends are tight.					
s. See that front spring ends are tight.					
t. See that front spring ends are tight.					
u. See that front spring ends are tight.					
v. See that front spring ends are tight.					
w. See that front spring ends are tight.					
x. See that front spring ends are tight.					
y. See that front spring ends are tight.					
z. See that front spring ends are tight.					
11. ELECTRICAL					
a. Examine and examine generator.					
b. Check generator output.					
c. See that all wiring parts are in good condition and connections are tight.					
d. Examine battery.					
e. Examine all lights and clean lamps.					
f. Examine all bulbs and sockets.					
g. Examine all wiring.					
h. See that all connections are tight at junction box.					
12. BODY					
a. See that interior is thoroughly clean.					
b. Examine for loose seats, loose screws, rattling windows. Examine entire coach for any projections that are liable to tear passenger's clothes.					
c. See that heating pipe covers are tight and that there are no projections.					
d. See that paint work is in good condition.					
e. Examine body all bolts.					
f. Examine driver's console.					
g. Examine front and rear brackets and see that same are tight in taper.					
h. Examine fire extinguisher. See if full.					
Should any discoloration of either oil or grease be noted, Foreman's attention should be called to same immediately.					

Engine _____ Rear Axle _____

Magneto _____ Oil Carrier _____

Generator _____ Transmission _____

Clutch _____ Steering Gear _____

Radiator _____ Battery _____

Front Axle _____ Starting Motor _____

Gals. of oil used _____

Miles per gallon _____

Gals. of gas used _____

Miles per gallon _____

Wet weight _____

General Remarks _____

Signed _____

Check Dept. _____

This Form Is Used When a Bus Receives a General Inspection

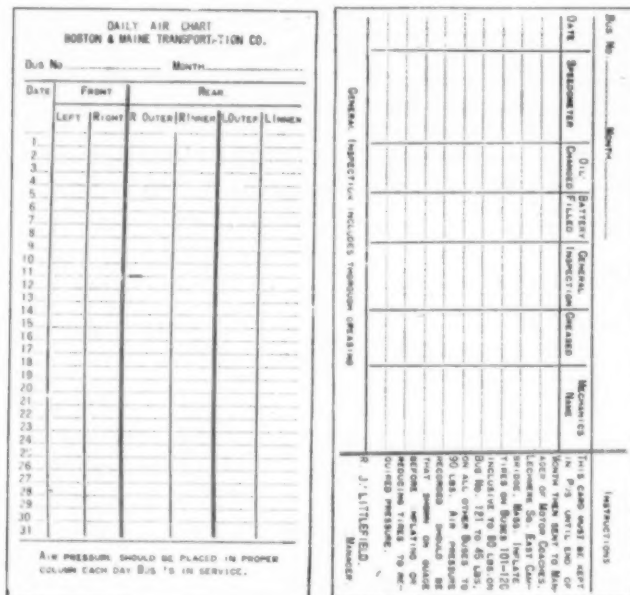
that the coach cannot operate at more than 35 m.p.h. The coach report card is taken by a mechanic who makes out a time card, also shown in one of the illustrations. After making all the necessary repairs, he denotes the finishing time and turns the card over to the foreman who inspects the work done.

The tires are also inspected at this time. The Boston & Maine Transportation Company does not own the tires used on its buses, but leases them from a tire company on a mileage rate, the tire company making all repairs.

tion is determined from the daily air chart and inspection card shown in one of the illustrations. One of these cards is, at the present time, kept on the instrument board of each bus. Small holders are being made in which to place these cards on the side of the bus near the driver's seat. The card contains seven columns, the first for a date and the next six, respectively, for speedometer reading, oil changed, battery filled, general inspection, lubrication and the mechanic's name who did the work.

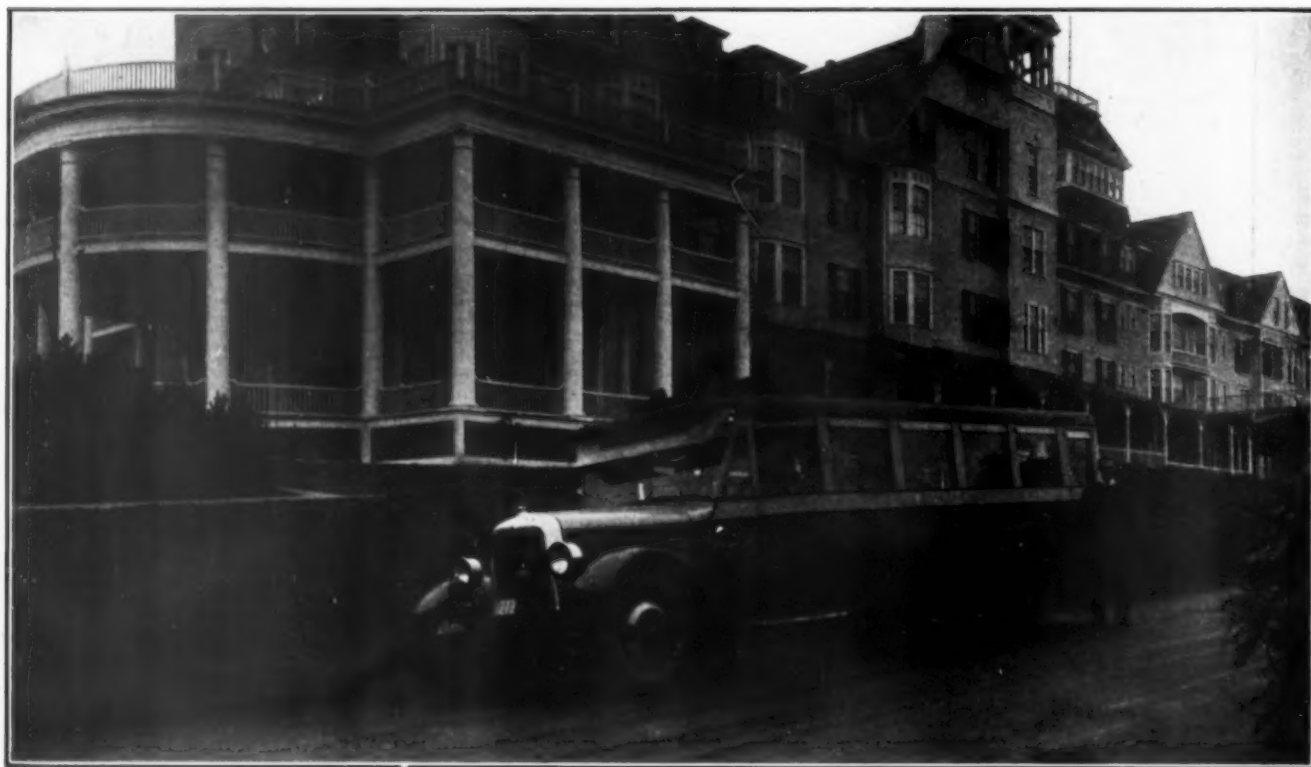
The problem of the Boston & Maine Transportation

the territory. As a result of this operating condition without an inspection card in the buses that there would be a tendency on the part of some of the repairmen to "pass the buck" to the other fellow when it comes to giving the car its usual inspection, greasing, battery filling, etc. With a card always in the box the mechan-



ical force on one division cannot say that they did not positively know whether or not the car was due for a change of oil, greasing or other work. Wherever the car is, the speedometer shows that it is due for this periodical work and the mechanical force is expected to take care of it, whether or not the bus is regularly assigned to that division.

and the southern part of Maine. One can readily see that with only 61 buses in operation there must be some rather small and widely scattered operations to cover



In Front of the Mt. Pleasant Hotel, Bretton Woods, N. H.

The mechanics assigned to make the general repairs secure from the garage foreman the general inspection sheet, Form 40, shown in one of the illustrations, one of which is kept for each coach. On the right-hand portion of the sheet are copied down from the coach reports handed in by the drivers at the end of each trick, the defects which have occurred since the previous general inspection was made. The mechanic first carefully examines these parts which have been reported and repaired to determine whether or not they are in good condition. This record of defects aids the foreman in determining the parts which cause the most trouble and helps him to keep a check on the quality of workmanship. After these items are checked off by the mechanic, he makes a thorough inspection of all the parts listed

TABLE SHOWING THE NUMBER OF BUS-MILES MADE BY 56 BUSES OVER A PERIOD OF FIVE MONTHS DURING 1926

Month	Bus-miles Regular	Bus-miles Special
May	45,023	4,954
June	77,641	3,654
July	138,374	3,577
August	140,197	3,417
September	128,257	5,858

on the sheet and after each part he notes whether the parts are O. K. and, if not, what work was done. After the inspection is completed, the foreman takes the bus out and tries the brakes to see if they will meet the requirements of the law and, at the same time, checks the speed governor to see if it is properly set. After

company's own experience. A careful record has been kept of the parts used to determine the number of each part to be kept in stock.

A new system of keeping a record of the material used has just been installed. The two forms used are shown in one of the illustrations. The smaller form is filled in either by the stockman, foreman or mechanic, and is signed by the person receiving the material. The items listed on these forms are copied onto the larger form which is in duplicate, the original a white sheet and the duplicate a yellow sheet. A record is kept for each coach. At the end of each week the original record is forwarded to the accounting department and the duplicate is retained by the stockman at each garage and is filed with the material charge-out slips to cover all of the items shown on the large form.

It is planned to keep at each stockroom such complete units as a rear axle, transmission, etc., which can be completely removed and replaced. In this manner maintenance can be speeded up and the unit removed can be repaired when time will permit.

Plans for the Future

At the present time most of the heavy repair work is done either at the Portsmouth or Boston garages. These two points are not yet completely equipped to make heavy repairs, as such repairs have not been necessary owing to the newness of the buses. However, plans are being made to handle heavy repairs at these two garages and also at the Greenfield garage. These



Twin Mountain Station, Located on the Route Through the White Mountains in New Hampshire

the bus has met the approval of the foreman, the general inspection sheet is signed by the mechanical superintendent.

The Problem of Spare Parts

The building up of an adequate stock of spare parts and material has been one of the most difficult problems for the management to solve. The problem is being satisfactorily worked out partly from the bus manufacturers' experiences and partly from the operating

plans will be fully consummated when the company owns all of its garages instead of renting some of them as is now the case. As the situation now stands, some of the work must be done outside.

The cost of maintenance per bus-mile is about 4.5 cents which includes labor, material and all indirect charges. During the month of August the fleet of buses averaged 6.5 miles per gallon of gasoline and 23.4 miles per quart of oil.

The Pro and Con of Railroad Bus Operation

New Hampshire commission in denying some B. & M. applications discusses subject thoroughly

RECENTLY in a decision by the Public Service Commission of New Hampshire applications by the Boston & Maine Transportation Company for a number of bus permits in the state were denied. Commissioner Brown who wrote the majority opinion said, among other things, the following:

"The Boston & Maine Railroad even to a greater extent than most railroads has suffered adversity for a long period of time, but by more efficient and economical operation in the recent years it has been possible to make a better showing, and taking the system with its departments as a whole, the year 1925 may well be classed a prosperous year.

"In spite of the success attained and a consequent improvement of conditions, passenger revenues have taken a downward trend by reason primarily of the inroads of the private automobile, and in an endeavor to do away with this unfortunate situation as to passenger revenues, the Boston & Maine Railroad purports to have brought these various petitions.

"Those in charge of the Boston & Maine Railroad seem to have been entirely oblivious of the possibilities of the motor bus as a means of passenger transportation until the year of 1925, when a few petitions covering routes in various parts of the state were presented for consideration by this commission.

"In practically all of the petitions it seeks authority to establish regular bus transportation facilities on highways running parallel with its rails. In most of the instances where the Boston & Maine Railroad has previously sought to eliminate train passenger service or has unsuccessfully attempted to completely abandon the line, it now requests the right to substitute bus service to be operated generally in lieu of, and in some cases in competition with, rail service. At a comparatively recent hearing before this commission a representative of the Boston & Maine Railroad testified that it was the intention of those in charge thereof to install a network of bus transportation lines covering the state of New Hampshire and in effect that the purpose of such action was to practice economy, render improved service, and protect the railroad from any possible bus routes which might be inaugurated by other individuals or corporations.

Railroad Plans Not Sufficiently

Comprehensive or Definite

"These petitions have been presented before the commission covering a period extending over several months, and at all times it has been impossible to gain any definite knowledge as to the eventual plans of the railroad for the future with regard to transportation in New Hampshire. Replies to inquiries made with relation thereto have invariably produced no real information as to the ultimate object which the railroad officials have in view, so that, generally speaking, this commission as well as the public at large is very much in the dark at the present moment as to the proposed plans of the Boston & Maine Railroad embracing the period of the immediate years to come.

If Rail Abandonment Not Contemplated, What Is?

"Whether this is a part of a plan to again seek complete abandonment of branch lines in this state is not in and of itself of great import except so far as this may be the sole reason for seeking the introduction of numerous bus lines in this state. Assuming that such is not the plan the question is left in a position where we must inquire into the merits of the petitions in several respects;—(1) whether bus lines will effect an economy to the Boston & Maine Railroad; (2) whether the public can be served adequately by bus lines in lieu of rail service; and (3) whether it is for the interest of the people of the state of New Hampshire to turn over its highways to the Boston & Maine Railroad upon which to exercise charter privileges previously granted to it as a carrier by rail.

Operating Cost Figures of

Steam Trains and Rail Cars Questioned

"The railroad testifies that the out-of-pocket cost in operating an average steam train is about \$1.25 per mile; that gasoline car rail transportation has an out-of-pocket cost of from 60 to 65 cents per mile, and that motor bus highway service costs, out-of-pocket, about 30 cents per mile. The protestants at some of the hearings have questioned the accuracy of these figures, it being argued that light gasoline cars designed to carry passengers only, as are the buses, can be installed and operated on the rails for less than rubber tired buses operated under highway conditions such as exist on many of the highways intended to be used for bus transportation. In proof of this, data from other railroads was referred to.

"In further substantiation of this assertion protestants have introduced in evidence statistics, compiled by the Boston & Maine Railroad for the Public Utilities Commission of Massachusetts, regarding the cost of operation of gasoline cars now actually in use in this state. The report made in Massachusetts stated that gasoline cars such as are now operated between Concord, New Hampshire, and White River Junction, Vermont, are operated at a cost to the Boston & Maine Railroad at 26 cents per mile. It was further stated that the actual cost of operating a steam train replaced by the gasoline car was 71 cents per mile and that the net saving as between the cost of gasoline car operation and steam train service was the difference between 26 cents per mile and 71 cents per mile.

"It is argued by the protestants that in arriving at the net saving as above stated, all important items of operation must have been included in the cost per mile as given, otherwise "net saving" is a misnomer. It is answered by the petitioner that the figures submitted in Massachusetts were estimates and did not involve or take into account many items of expense, and that gasoline car transportation would necessarily be at least twice the figure given to the Massachusetts commission.

"Whatever the relative cost of the various methods of transportation may be, the fact remains undisputed, even by the railroad, that gasoline car rail service will reduce the present steam train operating cost one-half. Taking

this fact into consideration we feel constrained to compare to some extent evidence which has been presented tending to show the operating cost of gasoline cars in other parts of the country; the figures particularly in mind showing costs ranging from about 18 cents to slightly less than 35 cents per mile. True it is that such comparisons may not be conclusive as to actual cost because of possible different conditions prevailing, but in light of all the evidence pertaining thereto we are firm in the belief that the Boston & Maine Railroad has not as yet perfected its gasoline rail transportation service economically and in other ways so as to give a true picture with reference to the real cost of such service and we feel that until such economies have been effected and until all efforts to reduce operating expenses on the rails have been fairly and honestly tried, service on the rails should not be abandoned by the Boston & Maine Railroad or given over to its subsidiary company to be handled on a roadbed to be maintained rather by the state and towns than by the interstate carrier.

Believes Railroad Favors Bus,

Whether More Economical or Not

"We question from the evidence before us whether at all times the item of economy to the Boston & Maine Railroad has been an important reason for seeking to eliminate train service and substituting bus service.

"The testimony is conclusive proof to us that the relative cost of gasoline cars and motor buses has not always been given serious consideration by the Boston & Maine Railroad, and that the question of economy itself is not the paramount issue with the railroad on all occasions. In fact, in explaining the reason why the railroad desired to run buses, at a greater cost than gasoline cars, the same official stated that, 'We want to make some experiments with the use of buses.'

"Too much stress cannot be laid upon the transportation problem which confronts the Boston & Maine Railroad and the people of the state of New Hampshire today, and any attempt by the railroad to effect economies in operation costs should receive serious and sympathetic consideration from this commission and the public at large. It is well understood that we are in a transition period as regards ways and means of transportation. Within the life of this commission, a period of fifteen years, a great change has come in transportation methods and by the same token what seems feasible and proper at the present time may appear otherwise in the days to come. There is a field for steam train service, a field for gasoline train service, and a field for bus service, but as to just how broad those respective fields may be, opinions differ widely, even among men who have spent their lives struggling with transportation problems."

Commission Not Opposed to

Bus Operation by Railroads

Chairman Gunnison of the Commission, concurring in part, said, among other things, the following:

"The real question before the commission in these cases is what should be the policy of the state in respect to bus operations by the Boston & Maine Railroad, through its subsidiary, the Boston & Maine Transportation Company. Should the railroad be restricted to furnishing service on its rails or should it be permitted to furnish transportation over the highways whenever such service will meet the needs of the public and will protect its rail service?

"This commission has heretofore placed itself on record as not opposed on principle to the operation of buses by the Boston & Maine Transportation Company, because it has already granted eleven applications by

this company to operate buses in New Hampshire. One of these applications was granted in spite of united opposition by all of the towns to be served, while some of the others met with strong opposition from the public. Yet the commission, after very careful consideration of the evidence, granted the petitions, and it is gratifying to be able to state that the commission has since been commended for its action by those most bitterly opposed to the petitions being granted. The reasons given in those cases by the commission for its decisions are applicable to the present cases.

Public Offered No Objection to Independents

"The basis for all opposition on the part of the public to the Boston & Maine Transportation Company running buses in New Hampshire, is the fear that it will lead to the abandonment of some non-profitable branch railroad lines in the state. Various other objections have been advanced but they were evidently made merely to strengthen the case and would never have been presented were the public assured that the operation of buses would not result in either abandonment or curtailment of train service. The real fight on the part of the public is to preserve its train service as it now is. It has no objection to buses as an additional service, but it does object to having them take the place of trains. This statement is made because of the fact that in no instance has the public ever opposed the granting of a petition to any applicant to operate buses in the state of New Hampshire, other than to the Boston & Maine Transportation Company. In fact, several towns and cities which are objecting most strenuously in these proceedings have bus lines operating within their borders by others than the Boston & Maine Transportation Company to whom permits were granted by this commission, after public hearings at which no one appeared in opposition.

"Not only is the public in New Hampshire not opposed to bus operations as such, but many of these bus lines now in operation are well patronized. There are fifty-one of them now operating in the state. This does not include buses running into New Hampshire from other states over which no regulatory body has any jurisdiction.

There Is a Demand for Bus Service

and Railroad Should Be Allowed to Give It

"The above facts demonstrate beyond all question that there is a public demand for bus service. Moreover, this demand is on the increase and must be satisfied. The question is, who shall satisfy it? Shall the Boston & Maine Railroad stick to its rails and see its patrons forsake its trains for this more modern and popular mode of travel and do nothing to stop it? In 1924 its passenger revenues were \$1,700,000 less than they were in 1923, and in 1925, they were \$1,500,000 less than they were in 1924, all due to the people forsaking its trains for motor vehicle travel over the highways. Within the past few years the Boston & Maine Railroad has actually lost millions of dollars due to motor truck and motor bus competition. Any sane person must admit that the railroad management should do something to stop this drain on its passenger revenues. Is there any better way to accomplish that result than by furnishing the public the kind of service it demands? The railroad's stock in trade is transportation and to sell its product it must carry in stock the kind of transportation the public demands. If it does not, the public will go where it can get it.

"Everyone will agree that good railroad service is of vital importance to the state of New Hampshire, and

that in order to give good service the railroad must have good credit. Prosperity to the railroad is therefore for the public good. In order to be prosperous its net revenues must be increased. How shall this be accomplished? Not by an increase in rates. Such a move would be disastrous to the welfare of the state. It must, therefore be brought about by economy and efficiency in operations or by an increase in business, or by both.

"This means for one thing, that the falling off in passenger revenues must be checked and if possible more people induced to ride on the trains.

"The railroad management has made a careful study of this problem and has found that those who ride for short distances have left the trains for automobiles and buses in far greater numbers than have those who ride long distances. It concluded, therefore, that to increase the riding on the trains its chances were much better with the long distance riders than they were with the short distance riders. Accordingly about a year ago it began experimenting with fast trains to make through travel more attractive and with buses to take care of the short distance riders.

"Fast train service was brought about, not by running more trains, but by eliminating stops of some of its regular trains at the smaller stations. The results have been encouraging, though the policy cannot be said to be entirely beyond the experimental stage.

The fares charged by the Boston & Maine Transportation Company are the same as the railroad fares except that where the railroad fare is not divisible by five, the bus fare is increased to the next highest multiple of five. For illustration, if the railroad fare between towns A and B is 23 cents, the bus fare will be 25 cents. If a train is not scheduled to stop at any town where the Boston & Maine Transportation Company is giving bus service, the bus will take passengers living in that town to or from the nearest railroad station where the train does stop, to their homes, and the total fare on the train and bus will be the same as it would have been had they traveled the whole distance by train. This is done by the railroad selling tickets at regular railroad fares, good on both the train and bus.

Railroad Gives Better Bus Service at Lower Rates

"This co-ordinated bus and rail service is due to the fact that the buses and trains are commonly owned. The fares of the Boston & Maine Transportation Company are lower than the fares of any other bus operator in the state. Moreover the service of the Boston & Maine Transportation Company is as good, if not superior, to the service of any other bus operator in the state. Its management is in the hands of men of intelligence and experience, who are competent and anxious to give good service, and its drivers or operators are well trained in their line of work and are required to pass an examination before they will be permitted to run a bus. Every bus has double rear wheels equipped with double pneumatic tires six inches in diameter. Most if not all of the buses of other operators in New Hampshire have single rear wheels and therefore do more injury to the highways than is done by buses of the Boston & Maine Transportation Company.

Non-Taxed Independents Damage

Highways More Than Railroad Buses

"It is hardly consistent to deny the use of our highways to the Boston & Maine Railroad, as the protestants claim should be done, on the ground that the buses of its subsidiary company will wear out our highways, while permitting our highways to be used by other buses which are much more injurious to our highways,

and while permitting our highways to be used by heavy trucks with hard rubber tires which do more damage to the highways than any bus can possibly do. Certainly the use of buses doing the least damage to our highways should be encouraged.

Railroad Pays Regular

Vehicle Tax and \$800,000 Beside

"Another reason given by the protestants why these petitions should not be granted, is that it would be unjust to the taxpayers to permit the railroads to use the highways which are maintained at the expense of the state. This objection applies with much greater force to other operators who pay nothing in taxes other than registration fees for their buses. Yet no one raises this objection as to them. Then why invoke this objection against the Boston & Maine Railroad which pays \$800,000 yearly in general taxes, besides paying all motor vehicle fees that other operators pay? Certainly some portion of this \$800,000 is expended on our highways and on the theory that those who pay for a thing have some legitimate claim to it, the railroad is better entitled to the use of our highways than are those who pay nothing in general taxes.

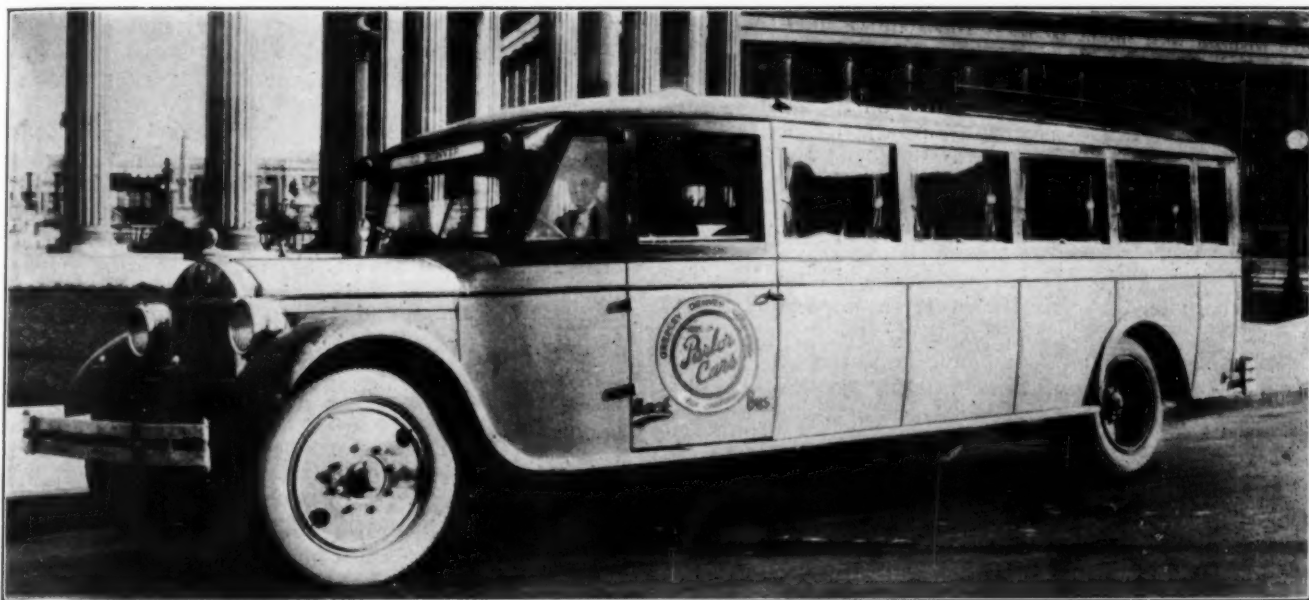
Rail-Highway Dual Service Cheaper

When One Company Provides Both Service

"If the people insist upon two kinds of transportation service, the one on the rails and the other on the highways, it must pay the cost and therefore it is interested to get this dual service at the lowest cost. This service can be furnished at less cost and better in quality by one company than it can by many competing companies. It is more clearly in the public interest to have the Boston & Maine Railroad furnish a co-ordinated bus and train service than it is to have rail service furnished by the railroad and the bus service furnished by independent competing companies."

In conclusion, Chairman Gunnison summarized his attitude toward railroad bus operation as follows:

1. The welfare of New Hampshire is dependent upon good transportation facilities.
2. To properly serve the public, the Boston & Maine Railroad must have good credit which it now lacks.
3. To have good credit it must add to its revenues, not by an increase in rates, but by economies in operations and by getting additional business, or by both.
4. The falling off in its passenger revenues must be stopped and more people induced to patronize its trains if possible.
5. In order to attract business, the public must be given the kind of service it demands.
6. There is a popular demand for transportation in motor vehicles over our highways; this is especially true for short distance riders.
7. The Boston & Maine Railroad, by its subsidiary, the Boston & Maine Transportation Company, can furnish better service over our highways and at less cost than anyone else.
8. Over the routes under consideration the public will be adequately served by buses during a portion, if not the whole, of the year. When buses cannot run, due to weather conditions or other cause, trains can be run. In that way the needs of the people will be amply taken care of.
9. By the installation of bus service, the operating costs of the railroad will be diminished.
10. By the installation of buses, fewer stops will have to be made thereby increasing the patronage of the trains by long distance riders, and so increasing passenger revenues.
11. The bus lines now operated by the Boston & Maine Transportation Company in substitution for trains are giving better service, because more frequent and flexible than was given by the trains which they superseded and its bus service accordingly is eminently satisfactory to the communities served. There is every reason to believe the same results would follow if these petitions were granted.
12. By operating buses the losses incurred on some of the branch lines will be so reduced that the possibility of their abandonment will be lessened, if not entirely eliminated.



One of the Mack Buses Operated Between Denver and Pueblo

D. & R. G. W. Operates Two Bus Lines

Thirteen motor buses and ten motor trucks of two subsidiary companies in service in Colorado

THE Denver & Rio Grande Western, through two subsidiaries, the Denver-Colorado Springs-Pueblo Motor Way, Inc., and the Western Slope Motor Way, Inc., is operating 13 motor buses and 10 motor trucks, supplementing the service provided by its freight and passenger trains in two parts of Colorado. The Denver-Colorado Springs-Pueblo Motor Way began operation on April 25 and the Western Slope Motor Way on June 1. A total of approximately 340 miles of bus lines are now in operation. In addition, freight service by motor truck is furnished on 220 miles of lines in western Colorado.

The Denver-Colorado Springs-Pueblo Motor Way is owned jointly by the Denver & Rio Grande Western, holding a 50 per cent interest, the Colorado & Southern, holding a 25 per cent interest, and the owner of its

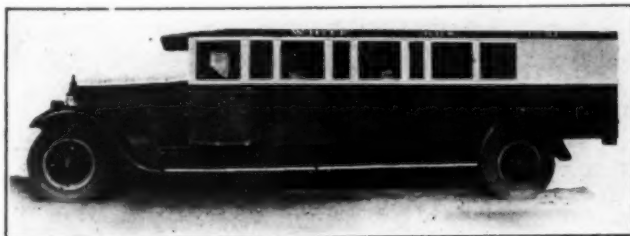
an interest in the Motor Transportation Company which had operated a bus and truck line on the western slope of Colorado between Grand Junction and Montrose, 74 miles, and between Delta and Paonia, 33 miles. In addition, the Western Slope Motor Way purchased the freight truck line of H. D. Davis, operating between Grand Junction, Montrose, Delta and Somerset. The Western Slope company has recently extended its lines from Montrose to Durango, a distance of 120 miles. In these instances, as in the case of the Denver-Colorado Springs-Pueblo Motor Way, the Denver & Rio Grande Western did not buy out the predecessor companies entirely, but arranged to have the former owners retain an interest in the Western Slope Motor Way.

Reasons for Adopting Buses

Prior to the acquisition of its bus lines, the Denver & Rio Grande Western, in common with other lines in the western territory, had suffered a loss of a considerable portion of its short haul passenger and freight business, particularly between Denver and Pueblo and on the western slope of Colorado, to independent highway carriers operating in competition with the railway. The passenger traffic handled by the Denver & Rio Grande Western from 1920 to 1925, showed a steady decline, the following table indicating the extent of the losses, in both number of passengers carried and in passenger revenues.

D. & R. G. W. PASSENGER TRAFFIC STATISTICS						
	1925	1924	1923	1922	1921	1920
Passengers carried...	828,002	910,919	1,099,890	1,128,633	1,188,032	1,630,062
Passenger revenues..	\$4,879,229	\$5,151,130	\$5,789,354	\$5,585,624	\$6,022,383	\$7,481,518

The statistics showing the average distance each passenger was carried during these years indicates that the loss has been in the short haul rather than in the long



A Bus Designed and Built in the Western Slope Garage

predecessor company, who retained a 25 per cent interest when he sold control to the Denver & Rio Grande Western. This company operates the line formerly owned by the Greeley Transportation Company, whose franchise and equipment were bought by the D. & R. G. W.'s subsidiary. The other subsidiary, the Western Slope Motor Way, began operation through the acquisition of

haul business. Thus, in 1920, the average distance each passenger was carried was 164 miles; in 1921, 156 miles; in 1922, 170 miles; in 1923, 180 miles; in 1924, 199 miles; and in 1925, 217 miles. The operation of motor buses by the Denver & Rio Grande Western was undertaken with the idea of retaining or getting back as much as possible of this short haul passenger traffic.

Denver-Pueblo Line

The Denver-Colorado Springs-Pueblo Motor Way is operated under the direction of I. B. James, president and general manager. Mr. James was the owner of the Greeley Transportation Company, the predecessor of the Motor Way Company. F. H. Peil, assistant to the president of the Denver & Rio Grande Western, is on the board of directors of the Motor Way Company, representing the D. & R. G. W. interests, but he has no active responsibility in the management. Furthermore, there is no active connection of any sort between the motor company and the railway. None of the railway departments work in conjunction with the departments of the motor company except occasionally when the pur-



D. & R. G. W. Rail, Bus and Truck Lines in Colorado

chasing department of the Denver & Rio Grande Western orders supplies and equipment for the motor company.

Six buses of the Mack parlor type are owned by the Denver-Colorado Springs-Pueblo Motor Way. These have a capacity of 25 passengers each. Of these six, four buses are regularly in service and two are held in reserve.

On the run between Denver and Colorado Springs, a distance of 75 miles, the trip by bus requires three hours, and by train, 2 hrs. and 30 min. Between Denver and Pueblo, a distance of 120 miles, the running time by bus is 4 hrs. and 30 min. and by train 3 hrs. and 50 min. The rates of fare are the same for transportation by bus and by train.

Southbound, buses leave Denver at 8 a. m. for Pueblo, and at 1 p. m. and 6:30 p. m. for Colorado Springs. In addition, a bus leaves Colorado Springs at 8 a. m. for Pueblo. Northbound, buses leave Pueblo for Denver at 11 a. m. and 5 p. m. and leave Colorado Springs for Denver at 8 a. m. This schedule is operated daily, including Sunday.

Bus depots are maintained at Denver, Littleton, Sedalia, Capital Rock, Larkspur, Greenland, Palmer Lake, Monument, Colorado Springs, Fountain and Pueblo. At Den-

ver and Pueblo the stations served are union bus stations but at the other points hotels and shops of various sorts are provided with accommodations for waiting passengers.

The maximum amount of baggage carried free is 25 lb. No baggage is carried on the buses, weighing in excess of 150 lb. for a single piece. Excess baggage is charged for on the basis of one-half the quoted passenger fare per 100 lb., the minimum collection being 25 cents.

The buses, which are of the parlor type on the four-cylinder Mack chassis, are equipped with individual chairs of wicker, upholstered in leather. The usual heating, lighting and ventilation facilities are provided. The buses are maintained in the Denver-Colorado Springs-Pueblo Motor Way garage in Denver. The workmen employed in the garage were formerly in the service of the Greeley Transportation Company.

Western Slope Motor Way

The Western Slope Motor Way, which operates passenger, express and freight lines over 220 miles of highway, is managed by Victor De Merschman, president and general manager. Mr. De Merschman was formerly the owner of the Motor Transportation Company which the Western Slope Motor Way succeeded. The headquarters of the Western Slope company are located at Grand Junction, Colo.

The equipment consists of seven motor buses and four motor trucks acquired in the purchase of the Motor Transportation Company and six motor trucks acquired in the purchase of the freight line of H. D. Davis. The total equipment now in operation is therefore seven buses and ten trucks.

Of the total of 220 miles of line, 120 miles have been added recently. All lines are covered daily by the buses on regular schedules and special trips to any point are made by arrangement. The trucks do not operate on any regular schedule but make their daily runs as soon as loads are available.

The Western Slope Motor Way carries about 1,500 passengers a month. The average haul is 50 miles and the rate of fare charged 5 cents a mile. The buses also carry 3,000 lb. of express matter daily.

The trucks handle l.c.l. freight of the same nature as that handled by the railways, the tariff comparing favorably with corresponding railway rates plus drayage. All the trucks are of four-ton capacity. The Western Slope Motor Way now handles approximately 300 tons of freight per month.

The company maintains depots with agents in Montrose, Delta and Grand Junction. In addition to the main office at Grand Junction, the company owns a garage where all repair work is done and equipment is rebuilt. The garage is a brick and cement structure, 50 ft. by 140 ft. A photograph of a bus designed and built in this garage is reproduced herewith. It is notable for the large express compartment in the rear. This bus has accommodations for 12 passengers.

No Train Service Reduction

Although it has not yet been possible to reduce train service as a result of the operation of motor buses and trucks by the Denver & Rio Grande Western, such operation has preserved for it a considerable amount of passenger business now going by bus which formerly moved by rail.

"RAILWAYS will be forced to go into the motor truck business to get any of the less-than-carload haulage within a distance of 100 miles," says H. E. Everhart, assistant general freight agent of the Gulf, Colorado & Santa Fe.



Bus Station at Big Bear Lake in San Bernardino Mountains

Suburban Bus Line Proves Success

The Motor Transit Company has developed a large mileage of lines around Los Angeles, Cal.

THE Motor Transit Company of Los Angeles, Cal., operates 1,400 route miles of suburban stage lines, carries more than 3,600,000 passengers a year, reaches 114 suburban towns and resorts outside of Los Angeles, and has 167 stages in regular service which make a total of 6,500,000 car miles a year. It maintains a scheduled service every 15 min. to all points on its line within 20 miles of Los Angeles; a 30 min. service to points between 20 and 40 miles distant;



Interior of San Bernardino Station

and an hourly service to points more than 40 miles from the city. On the lateral routes an adequate service is maintained and connections are made at all junctions and points where the routes cross. On the longer routes, such as those to Riverside, Redlands, San Bernardino, San Jacinto and Idyllwild, the regular local service is supplemented by limited schedules in each direction at two hour intervals with stops at only the most important points. The longest single run is 130

miles from Los Angeles to Gilman's Hot Springs at the foot of the San Jacinto mountains.

Regular service, on less frequent schedules, is maintained to a number of resorts in the San Bernardino mountains, but to reach these points a change to the special mountain stages is necessary at San Bernardino or Redlands, because the ordinary stages are not designed for use on the excessive mountain grades, many of which are as steep as 30 per cent. The roads through the mountains are very crooked with numerous hairpin turns, and at several points there are switch-backs because of lack of room for the ordinary turns. Cars in this service are specially designed with compound drives.

A New Idea in Stage Service

The service which is performed by this company is suburban in character, except that through the San Bernardino mountains, and is in distinct contrast to the operations of other stage lines on the Pacific coast, most of which have routes several hundred miles long with branches which are used as feeders for the main lines, or as alternate routes through heavy traffic territory. The theory upon which the Motor Transit Company has developed its system is that both the city of Los Angeles and the territory surrounding it will have a steady growth in population for many years to come, and that the present suburban and interurban rail facilities must of necessity be expanded or supplemented in the near future. Furthermore, that here, as elsewhere, the cost of extending rail lines for purely suburban business cannot be justified by the returns which may be expected from this class of traffic.

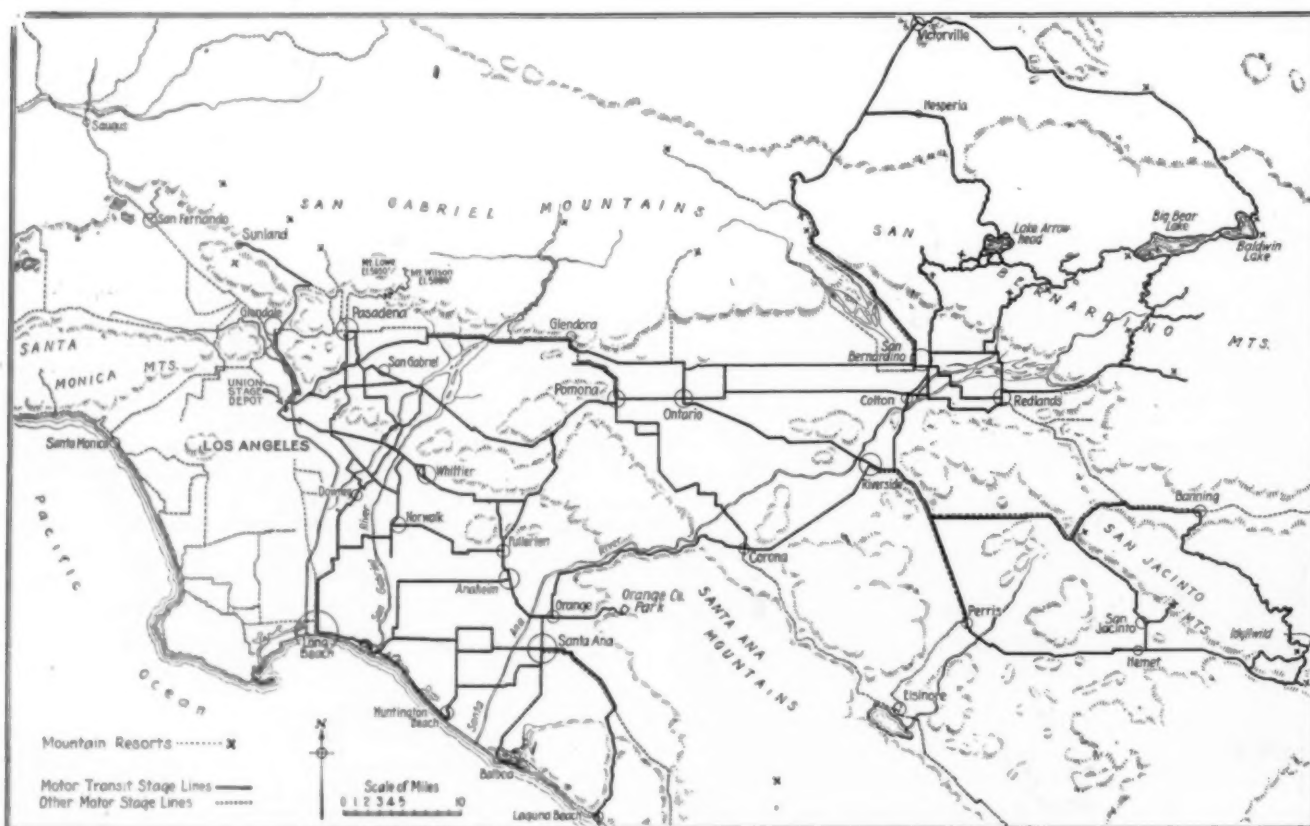
Again, as so frequently happens, the existing transportation routes all converged toward the business district of the city, and there were no lateral lines of public transportation, for those who desired to travel between the suburban towns, without making a wide detour through the city. In southern California there are in-

numerable small ranches of ten and twenty acres, so that the territory between the strictly urban centers has a density of population seldom found elsewhere, and many of those persons who desired to use the public transportation facilities did so at considerable inconvenience, because they were compelled to go to the established rail stations to take the trains.

Taking into consideration the fact that stage lines require no investment in private right-of-way, tracks, or other permanent structures, save depots and shops, and that a stage can be operated for about 20 per cent of the cost of running a train, and that the routing of stages can be made very flexible with stops at any point between established stations, the management of the Motor Transit Company felt that suburban stage lines could be used now to supplement the existing suburban rail facilities, and in the future avoid the necessity of heavy but unremunerative investment for their extensions. On these facts and theories the Motor Transit routes have been expanded from the original installation of one line between Los Angeles and Whittier in 1914 to the present system of 1,400 route miles. These require

automobiles or on the railroad. Ten thousand of the questionnaires were distributed and about 6,000 were returned with answers. From these it was found that 40 per cent of those replying, who resided within fifteen miles of Los Angeles, were commuters and used the stage daily, while beyond the 15-mile limit, only six out of a thousand did so more often than once a month. The reasons given for preferring the stage were convenient schedules, wayside stops, avoidance of wide detours to get to destination, and seats that are more comfortable than those in the railway cars, while many who owned their own automobiles said they preferred the stage to the automobile because of the parking problem in the city.

A further analysis of its passenger traffic has shown that the smaller towns outside of the 15-mile limit, having a population up to 2,500, supply only one passenger to a schedule. A town double this size supplies two; towns up to 10,000 supply three; and from 20,000 to 40,000 the number is four or five. This does not apply to important terminals where the regular stage is often filled and a second car must be used to protect



Bus Routes of the Motor Transit Company

the daily use of 167 motor stages, and an average of 10,000 passengers are carried daily.

An Analysis of the Traffic

While a number of the stage routes parallel existing rail lines, and exhaustive analysis of the traffic disclosed the surprising fact that there was little diversion of business from the rail lines to the stages, as most of the passengers handled are picked up or discharged at roadside stops, or travel between points where the rail facilities are not convenient for their use.

This company put a questionnaire in the hands of its patrons early in 1926 in an effort to ascertain the amount of use they made of stage transportation and why they traveled on the stages instead of in their own

the run, but it does apply with remarkable regularity to intermediate points.

Excellent passenger stations are maintained in every town served by the stages, and they have the same conveniences which are to be found in the more important rail stations. At the larger points and where passengers change cars, there are lunch counters, and restaurants and women's rest rooms. At many points outside the town wayside agencies are maintained at automobile service stations, country stores, and other convenient places. It has been found that the passenger stations and agencies tend to stabilize the traffic and, because it is desirable to relieve the drivers of the burden of collecting cash fares, an effort is made to sell tickets to prospective passengers wherever possible.

Sources of Revenue

Express, mail and newspapers constitute important items of revenue. Express service is maintained to every point on the stage system, and consignees are notified by telephone immediately upon the arrival of express shipments. The tariffs limit the weight of express packages to 40 lb., but are compiled so that the charges are based on weight, bulk or value, and are computed on the basis which will give the highest rate.

The express service is one of the most popular features of the motor transit operations, as special attention is given to quick handling. A patron can telephone to the city for any article he needs and be assured it will arrive on the first stage leaving the terminal after it is delivered to the Transit Company.

Passengers are not allowed to take baggage into the passenger compartment of the stages. The cars are designed to carry the baggage, mail, and express on top or in a rear compartment, but in either case a cover is provided to protect the packages from dust and prevent them from being lost. The passengers' baggage is delivered to them immediately upon arrival at destination, so that no time is lost waiting for an attendant to make delivery through the baggage room. However, in case the passenger does not desire to accept immediate delivery, the baggage is sent to the baggage room from which it can be secured later.

The initial fare for any trip is 10 cents up to four miles, and 5 cents for every two miles additional, with no break in fares at less than 5-cent intervals. Round trip tickets are sold for 85 per cent of the basic rate;

has general charge of all the activities of the company. Superintendents have direct charge of drivers, stations and agents. They keep records of all equipment on their territory, and record the statistics of every run. This latter record includes the number of passengers handled and the points of origin and destination, revenue, delays, drivers' records and such other data as is needed to make a complete record. They assign the cars to the various runs and assign the drivers to the individual cars and must keep track of all relief assignments, both of drivers and stages.

Every run is protected, that is, if at any time the business in sight exceeds the capacity of the regularly assigned stage, an additional car is supplied to take care of the overflow, because one of the strict rules of the company is that a seat must be provided for every passenger. This requires that extra equipment, with a sufficient number of drivers, must be maintained at strategic points, so that they can be put in service at the points needed without undue delay. At a number of points, such as Santa Ana, Corona and Pasadena, where connections are made with other stage companies, it is necessary at times to run special cars to accommodate the interchange when the incoming stages are late and do not meet the regular schedules, or when the number of passengers exceeds the capacity of the regular stage. This is done even if there is only one more passenger than the regular stage will accommodate.

At Los Angeles there is a dispatcher, reporting to the superintendent, who has charge of the equipment entering and leaving this terminal. He assigns the drivers



Buses Used in Suburban Service

10-ride and 30-ride tickets are sold at 75 per cent and 60 per cent of the one-way fare respectively. The ten-ride tickets may be used by any member of the purchaser's family, but are limited to 30 days, while the 30-ride books are good for 90 days, but may be used by the purchaser only. Monthly school books, to be used only by pupils and teachers, good only during school hours, and in the school district, are sold at rates slightly under those for the 30-ride commutation tickets, and the rates for these books disregard the usual fare-breaking points.

Supervision

All operations are under the direct supervision of superintendents, reporting to the general manager who

and cars to the various runs; sees that the stages leave on scheduled time and that all runs are protected; that all passengers have tickets and are loaded on the right cars. Another dispatcher at San Bernardino handles the stages on the mountain division in the same manner, but, as the company handles freight as well as passengers in the mountain territory, this dispatcher also has charge of the motor trucks which are used in the freight service.

In addition to the superintendent and dispatchers, there are three transportation inspectors and one student instructor with roving commissions, who are constantly traveling over the various routes to give instruction to drivers and agents and determine means of

improving the service. One of the fixed policies of the company is to make a constant effort to improve the service at every point and to this end it solicits suggestions from agents, drivers and patrons, as well as the supervisory forces themselves. When a new route is opened, a house-to-house canvass is made, in which every family along the road is interviewed, and the schedules are discussed and suggestions solicited as to how the service can be made more attractive. Copies of the proposed schedules are left in these homes, and members of the family are invited to use the service wherever possible. When a material change in existing schedules is contemplated, a similar canvass is made, and it sometimes happens that a complete revision of some of the tentative schedules results from the suggestions received.

Conditions of Employment and Promotion

Nine hours constitute a maximum day's work, and the assignments to the runs are made so that it is not necessary to change drivers except at terminals. Drivers are selected on the basis of character, intelligence, physical



Smoking Compartment of a Motor Transit Bus

fitness, and experience. When a man makes application for the position of driver, he is given an examination to determine whether he can meet the physical and intelligence requirements. If he passes these, he is given two weeks' intensive training by the specially assigned instructor while his references are being investigated. This instruction covers not only the driving of the stages, but his duties in regard to tickets, cash fares, baggage, express and mail, and his relations with passengers, agents and other departments of the company's organization.

If his references are satisfactory and he qualifies in other respects, he is put on the extra list and makes a number of runs under the supervision of the instructor. After this, he is used on the less difficult runs and after he has gained experience, if his services have been satisfactory, he is advanced to the more important runs as opportunity offers. The Motor Transit Company finds that men who have driven motor trucks generally are the most satisfactory recruits, because they are used to driving heavy cars and are not afflicted with speed mania as so many seem to be who have driven taxicabs or private automobiles.

Strict discipline is maintained, and a record is kept of every driver under a modified form of the Brown system. Courtesy to passengers and traffic officers is insisted upon, and violations of this rule, or of traffic rules, are regarded as serious. An accumulation of 50 demerits in any one calendar year automatically causes

the discharge of the offender, but the men are given the privilege of reducing an accumulation of demerits by periods of clear record or by meritorious service, and under this system one merit mark erases one demerit. Every report of conduct, whether favorable or unfavorable, goes on record.

A bonus system is in effect and is applied to all drivers who have been in service one year. The bonus is not based on mileage, but is a flat rate of \$5 a month for those who have clear records, with a reduction of \$1 for every demerit mark standing against a man at the end of the month. Therefore, to secure a bonus for any month, the driver must have less than five demerits against his record and he must have worked full time unless he has been granted leave of absence because of sickness.

Wages are based on the mileage made during the month, but as the drivers themselves are not responsible for the assignments to the runs, they are guaranteed a minimum wage of \$5 a day, and on many of the runs their pay may amount to considerably more. The extra men are guaranteed a minimum of \$125 a month, but must always be available when needed. If the men on the extra list do enough work so that the mileage rate exceeds the minimum guaranteed, they are paid on the mileage basis.

The system of promotions contemplates the use of the experience gained in driving the stages and through contact with the public as well as the training the drivers are given along other lines. For this reason, wherever possible, they are promoted to the positions of agent and supervisor by a system of selection which is partly based on the record of discipline. At present, many of the supervisory forces, superintendents and agents have risen from the rank of driver. Every effort is made to treat the men justly and with the same courtesy that is demanded of them. At all layover points they are provided with beds and shower baths, and when away from home at places which are not regular layover points, lodgings are provided at the company's expense, but no meals are furnished. As a result of the treatment they receive and because they have a chance of promotion, the turnover is small, averaging only about 10 per cent a year.

Safety of operation and avoidance of accidents is constantly kept before the drivers and there is keen competition among them to make low monthly and annual records in this respect. As a result, the number of accidents per 100,000 car miles was reduced from eight in 1922 to 5.6 in 1925. The highest number per 100,000 car miles in this period occurred in March, 1923, when the rate was 12.5, while the lowest was 3.79 in May, 1925.

Repairs and Records

The Motor Transit Company designs and maintains all of its own equipment, and rebuilds its cars as required. Because its system is reasonably compact, only one repair shop is required and this is situated at the general headquarters of the company on Market street, Los Angeles.

Thorough inspection of all cars in service is made daily, and the inspector must certify that brakes, transmission, steering gear and axles are in first class condition and safe for service, and that all axle nuts are tight. The wheel alignment, particularly the track of the rear wheels, is watched closely, and drivers are required to make out defect reports daily, or at the end of any trip if necessary, to facilitate inspection and save time.

When the cars are brought into the shop for general repairs, the engine is removed, cleaned thoroughly and given a general overhauling; valves are ground and all worn parts replaced. The magneto is inspected and

tested and, if found defective, is replaced by one from stock. It is then put in good condition and returned to stock for later use. At the same time the wheel bearings, axles, differentials, steering gear, transmission and other parts of the driving mechanism, and the springs and frame are given the necessary attention. The body is repaired, or rebuilt, and painted, and the upholstery is repaired or renewed.

Every item of repairs and its cost is reported, and a detailed record of these is kept for every car. They are reduced to a mileage basis so comparison can be made monthly and annually. Furthermore, a record is kept of every accessory used on the cars. When such items are purchased, they are given serial numbers, and the cost, date of purchase, and the cars to which they are applied is recorded. From that time until the device is worn out or discarded for other reasons a complete record is kept of the date, cost, and nature of any repairs that are made. In addition, a complete record of the number of miles run per gallon of gasoline and per quart of lubricating oil, is kept for the individual cars.

Other records cover the cost of operation and revenue of every line by months and annually, and these are reduced to a mileage basis for purposes of comparison with other parts of the system. As a result of this system of record keeping, the management knows at all times the types of cars and the individual cars, as well as the types of accessories, that are giving the most economical service, and the lines which are most profitable and those which needed closer attention as regards cost or revenue. By having this information available currently, it is possible to investigate at once to determine whether changing conditions require a rearrangement of schedules or an increased or decreased service.

Origin and Development of the Company

The Motor Transit Company was organized in 1914 to operate a stage line between Los Angeles and Whittier, about 15 miles, and from this beginning it has expanded its operations by the purchase of other lines and by original certificates over routes not already covered. In addition to the suburban lines it now operates, it once had lines to San Diego on the south and Bakersfield on the north. However, other stage companies were running stages between these points and because it desired to confine its activities to its suburban lines, it sold the route between Bakersfield and Los Angeles to the California Transit Company in the spring of 1926. At the same time it traded the San Diego line to the Pickwick Stages System for the lines between Los Angeles and Santa Ana; Riverside and Long Beach, by way of Santa Ana; from Pomona to Long Beach, through Anaheim; Santa Ana to Laguna Beach; and Santa Ana to Newport and Balboa.

The theories upon which this system is based are in contrast to those underlying most motor bus systems. Its owners believe there is a better future for a compact system of suburban and interurban lines in a well populated metropolitan area, where density of traffic is high, and the individual trips comparatively short, than for a system having a larger mileage, much of which produces little traffic and which must rely on long hauls.

There has been no studied effort to compete with existing rail lines, although so widely distributed a network of stage routes must of necessity come into competition with the railroads to some extent. On the other hand, the management of this company has held to the basic idea that it is to its interest to supplement rather than compete with the existing rail facilities and to give service to and between points where, otherwise, development of urban centers would be delayed by lack of transpor-

tation. The management believes that stage transportation can be made satisfactory to the people and remunerative to the owners, and that, if this can be done, necessity for the extension of purely suburban rail lines which cannot soon be made to pay will be avoided.

Know Costs Through Proper Accounting*

By J. F. Winchester
Standard Oil Company

OPERATORS, in the majority of instances, will employ a system of accounting which, to a large degree, will be fitted in with their accounting methods established long before motor vehicle transportation came into general use. The logical thing to accomplish through any transportation accounting system is to furnish those directly in charge with a record of the direct transactions which have taken place, at an early date.

The majority of accounting systems that I have seen have never taken into consideration any factors pertaining to the detailed operation cost of the individual units in the vehicle itself. On a unit repair basis, to be certain that overhaul costs are within reason, it is necessary that each unit be repaired on an individual basis, and accounted for as such. To keep before ourselves continually the progress of the work through the shop, we have employed a system of this kind which gives to the foreman an accumulation of the time on a given job to each current day. At the completion of the work this is summarized and we then have a detailed account of the cost charged against each unit. This gives us a direct comparison and enables us to put our work through the shops practically on a flat rate basis, and after a period of time we have accumulated a definite set of data that gives us a clear outline as to the comparative performance of earlier versus later models of a given make, or one make with another.

To determine whether it is more economical to overhaul or repair a vehicle, we make an estimate on it before it passes through the shop. This estimate is made on a certain standardized form which has blank spaces allowing for notation of additional work to be performed, provided the regular list does not have an item meeting the need of the man making the estimate.

Estimate Sheets

From the estimate, together with our general experience and past records, we are able to determine accurately whether a vehicle should be overhauled, salvaged or traded in. These estimate sheets are used in the various shops, and after a job is completed we have a very complete outline of the total cost, as compared with the estimate, and can judge the efficiency of one shop against another.

To my mind, these kinds of check figures are the most important that we maintain. They place before us clearly and definitely a complete picture of each equipment that comes into the shop.

A comparison of actual mechanical performances is the general way in which a vehicle should be judged. It cannot be judged correctly unless some such system of this kind enables you to place your finger definitely on the factors that affect the operation one way or the other.

* From a paper presented at the meeting of the Society of Automotive Engineers at Boston, Mass., on November 16.

R. M. T. C. Seeks to Enter A. R. A.

Motor transport officers at Chicago meeting perfect permanent organization—Addresses by R. W. Van Doren and T. C. Powell

THE Railroad Motor Transport Conference met in Chicago on December 1 and 2 and heard a report from its executive committee recommending the seeking of affiliation with the American Railway Association. This report was acted upon favorably and the chairman of the conference was instructed to undertake negotiations with the A.R.A. to this end. The Chicago meeting is looked upon as the first official meeting of the conference, the two previous meetings—that at Atlantic City in June and that at Providence in August—being considered as of a preliminary nature. It was the sense of the conference that, if affiliated with the American Railway Association it should continue its activities as it has to date in the collection and co-ordination of information relating to highway passenger transportation, motor truck operation and the rail motor car.

Over 60 delegates representing 30 Class I roads and 55 per cent of the mileage of the country were in attendance.

Temporary officers of the conference (see Motor Transport Section, *Railway Age*, September 25, page 591), were re-elected as permanent officers, with the exception of the temporary secretary and treasurer, F. J. Scarr, supervisor motor service, Pennsylvania, who declined the nomination. H. Newcomb, assistant to vice-president, New York, New Haven & Hartford, was elected to fill this position. The conference plans to have three meetings a year, with the next scheduled for the Pacific coast some time in April.

Motor Coach Transportation

The Chicago meeting, as in the case of previous sessions, was closed to the public and the press. Admission to the meeting and copies of the detailed minutes are available only to railroad officers.

The first session of the meeting was devoted to a discussion of highway passenger transportation, under the chairmanship of T. B. Wilson, supervisor of transportation, Southern Pacific.

Mr. Wilson opened the discussion by telling of some of the developments in bus transportation on the Pacific coast, stressing the long haul operations recently inaugurated between San Francisco and Los Angeles. Buses in this service, he said, have toilet and lunch room facilities and make the 455 miles in 14 hours and 40 minutes—an average speed of 33 m.p.h. There are express buses which make only five stops en route. Local buses on the same route make the trip in 16 hours and 35 minutes. The fare on the local bus is \$12.85, with a surcharge of \$3 for the Limited.

He told of some of the lines doing a very good business over long distances involving night trips, where he said that passengers were content to recline in the bus seats and ride all night. Another development, he added, was the great amount of consolidation among the independent operators. He also told of a number of reforms of taxation in California. On June 30 he said that there were 655 licensed bus and truck operators in the state, of which number over 300 were passenger lines. Mr. Wilson, in reply to a question, gave the schedule speed of a number of long distance bus routes, showing that

schedules were almost as fast as train service and the bus rates were usually lower. He said that a number of operators were building a great deal of their own equipment; tires were as a rule supplied on a contract basis.

F. W. Robinson (Union Pacific) told of a law governing motor vehicle taxation which had been passed in Oregon by a substantial majority in a referendum, indicating a great deal of popular consideration.

N. D. Ballantine, assistant to the president, Seaboard Air Line, advocated taxation on an economic basis for motor vehicles, adding that any severer measure would react against the railroads themselves should they wish to engage in motor transportation.

Mr. Wilson told of the big business which one of his company's passenger trains had drawn. This train, running between Los Angeles and San Francisco non-stop carries a club car, a "rubberneck" car (half open and half closed), a diner serving meals all day long and a "cabinet lunch car" (partly coach, partly lunch room).

B. W. Arnold (Chicago, North Shore & Milwaukee) next told of his company's highway operations. He said that his company, although it has been in the business for five years, finds new things to learn about it each day. The North Shore people do not look upon themselves as railroad men exclusively, but rather as transportation men. He commented on the unfavorable legislation passed with reference to highway transportation which later came back to the injury of the railroads themselves when they engaged in it. The motor bus business, he added, is here to stay and "it is our job as transportation men to carry the people as they want to ride." "The first thing we have to find out," he added, "is that if we are going into this business we have got to go into it wholeheartedly."

He said that the North Shore, with its allied interests, was now operating 16,000 miles a day with motor coaches. The charter field, he said, was a fruitful field for development. Mr. Arnold then gave some details on the development of motor coach service on the North Shore, telling something of the working conditions and wages paid to labor.

The Rail Motor Car

The discussion of the rail motor car was led by N. D. Ballantine, assistant to the president, Seaboard Air Line. Mr. Ballantine expressed the hope that the conference would be able to collect information in its field which would be of real value in helping the railroads to increase earnings.

The first speaker on this subject was E. Wanamaker, electrical engineer, Chicago, Rock Island & Pacific. Mr. Wanamaker said that his company in studying lines of light traffic felt that maintenance costs could be held down in the neighborhood of \$300 per month and that a motorization of power on the lines would cut the C.T. charges somewhere around 30 or 40 per cent. On this basis, he said, these lines would probably pay a fair return on the investment. He then outlined the use of rail motor cars of the Rock Island. At first, he said, they had four McKeen cars. These cars were motorized with modern gas-electric equipment and made up in

two-car trains of 70 to 75 tons each. He spoke favorably of electric transmission for rail motor cars, particularly for cars of the larger types. Looking forward to the time when traffic may diminish, he said, the motor car should be so designed that it can be operated singly without trailer. He spoke of the proposal to use two 275 h.p. distillate burning plants in rail motor cars and do light switching and freight service. He spoke also of experiments with motors using fuel oil and other fuels besides gasoline. The developments of engines to burn a light fuel oil something of the nature of kerosene would come, he predicted. The Diesel engine, he felt, due to the high initial cost, the weight and the scarcity of mechanics able to take care of it in sparsely settled territory would be used more or less in districts where there were plenty of trained men able to handle it. He stated that steam enginemen had proved very capable operators of rail motor cars.

Mr. Ballantine stated that according to inquiry he made on nine roads with 23 rail motor car runs the weight of steam trains was 2.57 times that of the motor equipment and that the weight was better distributed over all wheels on the rail motor equipment and consequently it could make a better schedule. Another advantage was the ability to keep a better record of fuel oil than coal. The roller bearing equipment on the rail motor cars was likewise an improvement.

D. Crombie (Canadian National) outlined the use of rail motor cars on his road, stating that it was operating 5,000 train miles a day by means of rail motor cars. C. E. Brooks, chief of motive power, who was responsible for the development of this type of equipment was at present in Russia investigating further into development of this type of vehicle. The fuel cost of the oil-electric cars, based on United States prices, he said, would run about 1½ cents a mile.

The early part of the afternoon session on December 1 was devoted to a general discussion of the rail motor car. It was brought out that in a number of cases these cars were used to handle freight service, drawing as high as five loaded freight cars as trailers. It was pointed out that the rail motor car takes the place of steam equipment rather than acting to draw traffic away from the highways.

The second day's session was devoted to an informal discussion of the motor truck under the chairmanship of G. W. Lupton, assistant to vice-president of the Atchison, Topeka & Santa Fe, who acted in the absence of G. C. Woodruff, assistant freight traffic manager of the New York Central, who was scheduled to preside.

Mr. Van Doren's Address

The first speaker of the evening was R. N. Van Doren, vice-president and general counsel of the Chicago & Eastern Illinois. His remarks in abstract follow:

I believe that to properly approach the question and to assume the right attitude toward it, we must first get a true concept of transportation's place in the economic program. Unless we view it from the broad viewpoint of that status in industry we are not going to solve the problem and in fact we are going to postpone and make more difficult its solution. May I, therefore, at the outset give to you what my thought with reference to the economics of transportation is, in just a paragraph?

The function of transportation, first, is the completion of production. Production is the creation of economic value, the making of wealth available for human wants. Transportation, therefore, is not a goal but it is a means to the goal of ultimate production.

Remarks of Chairman Russell

At the dinner on the evening of December 1, Chairman A. P. Russell (vice-president, New York, New Haven & Hartford and president, New England Transportation Company) opened the discussion saying, among other things, the following:

"It was along in April or May of this last year only, when through conferences between Mr. Scarr of the Pennsylvania and the representative of the *Railway Age*, whose name I will not mention because he is present, suggested that there was a need from the railroad standpoint of getting together an organization of men representing the various departments of railway life who would undertake to assist the railroads in determining what their policies should be in view of this new form of transportation which has come into existence principally since the close of the war, and someone, I don't know which of those two gentlemen, prepared a call which they asked two or three of us to sign, suggesting that it might be advisable to informally get together at Atlantic City in May, at the time the mechanical section of the A.R.A. was meeting there, and to discuss this question.

"None of us had any authority to act, none of us knew how your speakers would take it, but such a letter was prepared and signed and resulted in a very enthusiastic meeting at Atlantic City, with which some of you are familiar, and at which Mr. Lyford presided.

"We have recognized and I think we are supported in this matter of recognizing the fact that this is not an operating organization, it is not a traffic organization, it is not a legal organization, but it is a composite of all those elements which go into a question which is now in its infancy and which within the next two years will be, in the opinion of some, the most important question which is before the railroads of the country for their consideration.

"And while personally I have been very careful these last three or four months to refrain from advocating any measure in particular, tonight I feel entirely different. I feel that we have today taken a step which is far in advance of anything which up to this time has been done. I have doubted whether it would be possible to bring into one thought the minds of all of the railroads of the country, and while that may be so I think we have gone a long way in conciliating the views and establishing a point of contact on these various phases of this most important question which will be regarded in years to come as an inception which we are rather celebrating tonight as a very important movement."

It is well for us to understand that the railroads have no vested rights in transportation. The thought is sometimes expressed that the motor vehicle is invading railroad territory and taking that which belongs to steam transportation. There is absolutely nothing to the proposition because we have no right to say that all of the transport trade and all the commerce of the country must be carried by steam transportation. We have no just, vested right. The farmer, if he chooses, may haul his potatoes in a wheelbarrow even though he lands in the bankruptcy court when he gets there.

The public delights to talk about the railroad monopoly. The advent and advancement and progress of the motor vehicle has demonstrated the mythical character of that monopoly. If ever we thought we had such a monopoly most of us have gotten that idea out of our heads long before now. A motor vehicle is

judgment will take the place of steam transport whenever it demonstrates its capacity to handle the traffic of the nation more economically and more expeditiously than the steam roads can do and when that time comes we either, as I view it, must go into the motor bus business or get out of steam business.

That is a real competition too, and in some respects a competition which we cannot hope to meet. When a motor truck can start from Milwaukee with a truck load of household goods and deliver them in Chicago cheaper than a railroad can bring them by freight, you can't hope to compete with that kind of service. That is exactly what is transpiring between Milwaukee and Chicago today. It is a concrete situation and not a theoretical one with which we have to deal.

The effect of it all has been to bring about a more intensive study of traffic conditions and railroad costs. Perhaps a more intensive study is now being made of terminal casts than has ever been made in the history of railroads. I know it is true here in the Middle West. All this has been brought about because of the competition that has brought our short haul traffic to a place where it is unprofitable and where some people (so they tell me) think that it ought not to be regained, while others are firmly of the contrary opinion that the l.c.l. business can be made profitable.

The Railroads' Inertia

I think that one of the most serious criticisms that can be made against the American railroad man is that of inertia. He takes the attitude that because a thing has never been, therefore, it can't be done, and because it has always been done this way, therefore, it always must be done this way and this way is right.

Those of us who have come into new railroad organizations after many years of experience with other railroads have had that experience and have found how difficult it was for us to work our way into that new organization because of inertia of the men and if we had a new idea we had to keep it to ourselves for a long while until we let it seep through and gradually let the other fellow get the benefit and put it into operation for the organization. That is not said in criticism at all. It is merely the observation of what we all know.

I don't believe the American railroad man is to be particularly criticized for it because the conservative man, the man who is conservative about his decisions and does not rush headlong into innovations, is after all the one you tie to as the successful man; and yet when a problem such as we are now considering comes up I tell you we have got to get out of the rut, we have got to get out of the old ways of doing things or else we have got to get out of the business of handling the things which our competitors are attempting to handle.

What then should we do? Our criticism (and there is ground for criticism) and our opposition should be a constructive criticism and a constructive opposition and that can be done as it is being done on many railroads in this country today. We cannot hope (if we have any such idea) to destroy a competitor which the public demands. Economic law is inexorable and will eventually select the form of transportation which can most efficiently handle the nation's traffic.

Public Has No Right to Duplicate Service

But the public has no right to demand a duplication of transportation when the effect of such duplication is to cause one form of that transportation to be operated at a loss, and therein lies one of the vested rights of the steam railroads in transportation. Merely a vested

right not to have its property taken away, and, therefore, the choice should be made in those cases where the railroads cannot enter the bus or truck business. There cannot be both forms. The public, I believe, will come to the point where they will make their choice and abide by that choice and then the carriers may determine whether or not to let the bus go or to seek to operate that bus as the public wants it operated.

I think as late as the August meeting in Providence, we thought that the New Haven situation was peculiar to that road and that we of the West didn't have the same situation to meet. We said, "Your problems are not ours. You have a congested, limited territory of short hauls, nearby towns, whereas out West we have the long hauls and great distances, therefore, your situation is not ours," and we sat complacently by and listened to their problems and how they solved them and thanked ourselves that we didn't have that thing to face and, lo and behold, today we hear of motor buses operating 1,300 miles and operating successfully. That is a pretty good haul even for a steam railroad and they haul on hard surface roads 1,300 miles and beat the trains both in time and in money. It is only a question of time when we of the Middle West will have to consider the long haul competitive traffic as well as the short haul, which is already here.

Therefore, it seems to me the wisdom and foresight of the little group of men who conceived the idea of this conference has been most emphatically justified.

The Motor Transport Conference Is Needed

After one hundred years of actual service of steam railroads we find it necessary today to maintain an association of railroad executives such as the American Railway Association, an association of traffic executives, etc. Surely there is room for an association to consider the matter of motor transport. And I say that this meeting and the meetings which have preceded it do credit to the American railroad man and show that he is not quite so susceptible to the inertia as he used to be and that he is willing to give of his time and thought right at the outset of a problem in an effort to solve it right and not wait until that problem has become a fixed and a difficult one and then seek to solve it.

Many of the railroads today are giving very serious thought to the matter of this substitution of motor service for steam service. The matter of terminal delivery is just before us and many of us will have to take a stand in the decision of that question. And when the time comes (as it looks as though it would come for a great many of them) when we must go into the motor truck and motor bus business, we don't want to then be faced with an adverse public sentiment created by our present attitude toward the motor bus and we don't want to be hamstrung by an overregulated industry, and it seems to me that here is where the Railroad Motor Transport Conference is to function most effectively because most of us will be and are novices in the matter of motor transport, and we certainly may avoid many mistakes by profiting by the experience of others and we get those experiences through the instrumentality of the committees of this kind.

Questions for the Conference to Study

Are we operating these motor vehicles as railroads or as subsidiaries? What kind of buses or trucks shall we use? Will union labor protest against this substitution? How shall we house and repair and fuel these vehicles? Shall the busses supplement or supplant train service? Will store-door delivery be profitable? Where

are we going to find the answer to these questions and similar questions that are coming up all the time? You will find the answer to some of them by bitter experience, but if we have through the medium of this con-

ference a place where many of those answers may be found through the experience of others, we may know where to get it and how to get it and avoid some of the mistakes which would otherwise be costly.

Address of T. C. Powell

The second speaker at the dinner was T. C. Powell, president of the Chicago Eastern Illinois. His remarks follow in abstract:

I have tried to approach the question of motor transportation, particularly the truck transportation, in an openminded way because I think the motor bus is and has developed new conditions that were never anticipated a few years ago. I have tried to look at it in the broad way that has been expressed by Mr. Van Doren, that we must assume a responsibility of our transportation in general. Why? Just because we have set ourselves before the country one hundred years as being in charge of the preferred transportation of the United States, the steam railroad transportation. Now that is no little responsibility.

But we must remember this, steam transportation in the United States and practically in the world was not one hundred years old before the public commenced to wonder if there wasn't a better system of transportation. That is a shock to a railroad man. We didn't have one hundred years' experience. We didn't even have one hundred years' trial before the public of this country, leading the other countries of the world in motor transportation, commenced to tell the railroad fraternity, "There is something the matter with you somewhere because we have found economic, speedy and satisfactory transportation and we don't care whether you have any trains or not half the time. We want them in bad weather when we leave our automobiles at home and we prefer to have your railroads take charge of the long distance freight because you can do it cheaper, but in a great many respects we think we have found a better device for handling traffic, freight and passengers, than the steam railroad man has put into effect or even conceived of.

I don't feel that I can express it better than Mr. Van Doren has expressed it, what transportation is in the final analysis, but we have different phases of transportation or rather subdivisions of transportation and I was very glad to have him speak on the question of closing our minds to the new ideas. The tank was the most successful novelty introduced in the World War and it was opposed by the British War Department because they hadn't thought of it. It couldn't be put before these gentlemen as a new device. It had to be brought on them through a secret in which they got the credit and the private individual who thought of the idea gets the credit only now that the war has been over ten years and the secret archives have been published.

There is nothing new about store-door delivery. It has existed ever since transportation was in effect. It has been modified to a large extent but store-door delivery has existed in this country always. It has existed in other countries always and it is because as railroad men we gagged at it that it has been irregular and so difficult of comprehension and still is opposed in a great many circumstances even to the extent of throwing up our hands in horror that anyone should talk of store-door delivery. But it is the only practical method of handling freight in the future. It is so practical that it has forced its way in spite of opposition on the part of the mossbacks who are opposing it.

Now what is so inconsistent as to acquire an accumulation of vehicles at the freight station to discharge a few packages of goods, there to be loaded into a freight car to be shipped thousands of miles and held until there is an accumulation of goods at that station, seeking its own particular channel to deliver to some isolated consignee? It is absurd. We will never get to the proper system until we take the broad view that may solve it, I mean until we can become convinced that the broad way is the proper way whatever that broad way may be.

Yesterday I spent all day in a meeting in St. Louis discussing the best method of bringing about a speedier, quicker service in St. Louis. It is perfectly marvelous (because I lived there several years) the changes that have come about in St. Louis in the last ten years in the matter of handling freight, or I might say since the war began. Any of the trains between St. Louis and Chicago will get the freight there in 24 hours and it takes 36 hours to get it delivered in St. Louis. If that isn't a reflection on somebody I don't know what reflection means.

Our job, from my point of view, is to utilize every facility of this kind but particularly to open our minds to finding out whether some of these things that have been taboo are not a little better than we thought they were. Any traffic man (there are some here) can show you that the cost of loading or unloading for the first 30 miles is more than they can get out of it. There is no money in doing things for love on the railroads. Unless you can show a net gain you might just as well stay out of the business.

Now what has happened? We have reduced our labor force. We have been relieved in our short haul traffic. We have taken off trains and engines and reduced our costs in maintenance of cars and engines. We have handled through cars and gotten rid of them quicker. We have a better reputation with the public. Our passenger trains are less impeded because we have so many local trains and there is not so much danger of accident.

If anybody will look at the freight statistics they will find outstanding several important items such as the gasoline with which your competitor propels the vehicle, the automobile which is soon to be our competitor is made up of sheet iron, metal and copper wire and aluminum, so in addition to getting and making a friend of every passenger you have lost you have gotten a ton of freight for every passenger ticket that has gone. A ton of automobiles the chances are will pay \$100. It will take several passengers to give you \$100 and so it is all through the list. The automobile is a benefactor to the public and to the railroad. It has relieved our minds. We haven't half the kicks we used to have.

I believe if this organization in the course of its work will record the various things that somebody opposes and then have those things analyzed they will find a great deal of good and a great help from that record. I mention store-door delivery because that is one of the things that is uppermost in the railroad minds. I say they will find, if they will broaden their views, some good in these things and especially if they tend to expedite the delivery of the freight.

New Equipment

Coach Body Designed for Interurban Service

THE Brown Body Corporation, 4917 Superior avenue, East, Cleveland, Ohio, is manufacturing an interurban type of coach body, the design of which is a medium between the expensive parlor coach and the lower-priced "pay-as-you-enter" type. This body design, an illustration of which was shown on page 598



Interior View of the Brown Coach Body

of the September 25, 1926, issue of the *Railway Age*, Motor Transport Section, provides the luxuries of the parlor coach in seating comfort and has sufficient interior finish in the way of headlinings, window drapes and floor coverings, to lend a pleasing appearance to the interior.

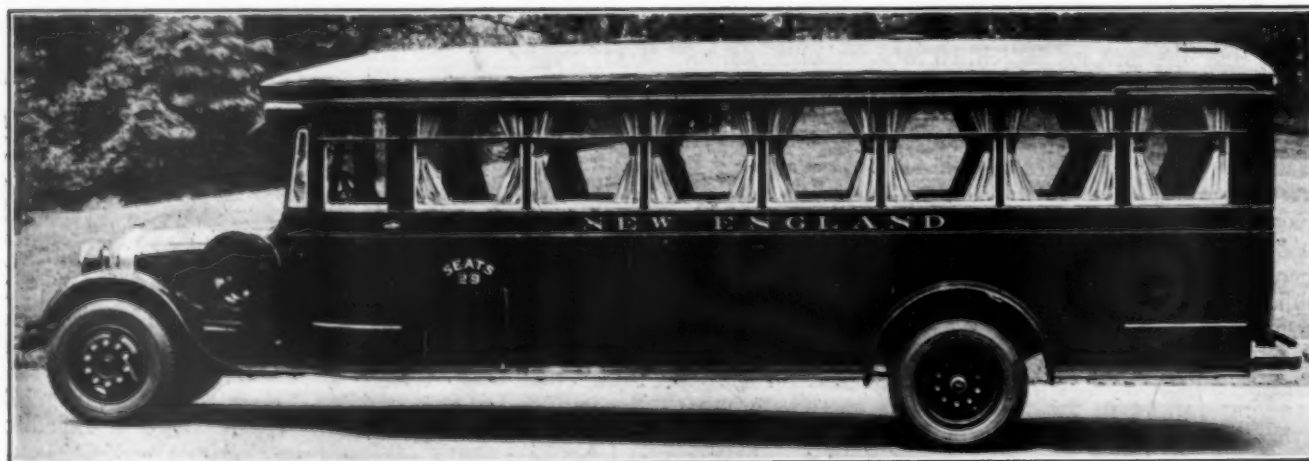
The construction of this body allows ample head room for standing passengers. Optional head clearances of 72 in., 73½ in. or 75 in. are available. The outside length at the belt line of the 29-passenger car is 22 ft. 11½ in., with a length inside of 22 ft. 7½ in. The outside width at the belt line is 7 ft. 6 in. and the inside width is 7 ft.

The extreme height from the bottom of the sills to the top of the ventilators is 6 ft. 8¾ in. The roof is a patented design, which permits the windows to be raised up into the roof. The windows are of the Brown patent aluminum type, which is said to be weather-proof, frictionless and free from rattling.

The head lining is an imitation leather to match the upholstery. The inside panels below the window-sills are metal plates covered with imitation leather, which also matches the upholstery. The joints are covered with metal strips covered with imitation leather, and are fastened with countersunk washers and nickel-plated screws. The window stops and finishing sticks are finished in mahogany.

The floor covering is laid over matting, which is cemented to the floor. The edges are protected with aluminum mouldings fastened with oval head brass screws. All the doors are of the coach type, the service door being operated by the company's standard control, which is nickel plated. The emergency door is fitted with a heavy three-way lock, equipped with a lever handle and safety catch. It is operated from the inside only. The driver's door is equipped with a Yale lock and tee handle.

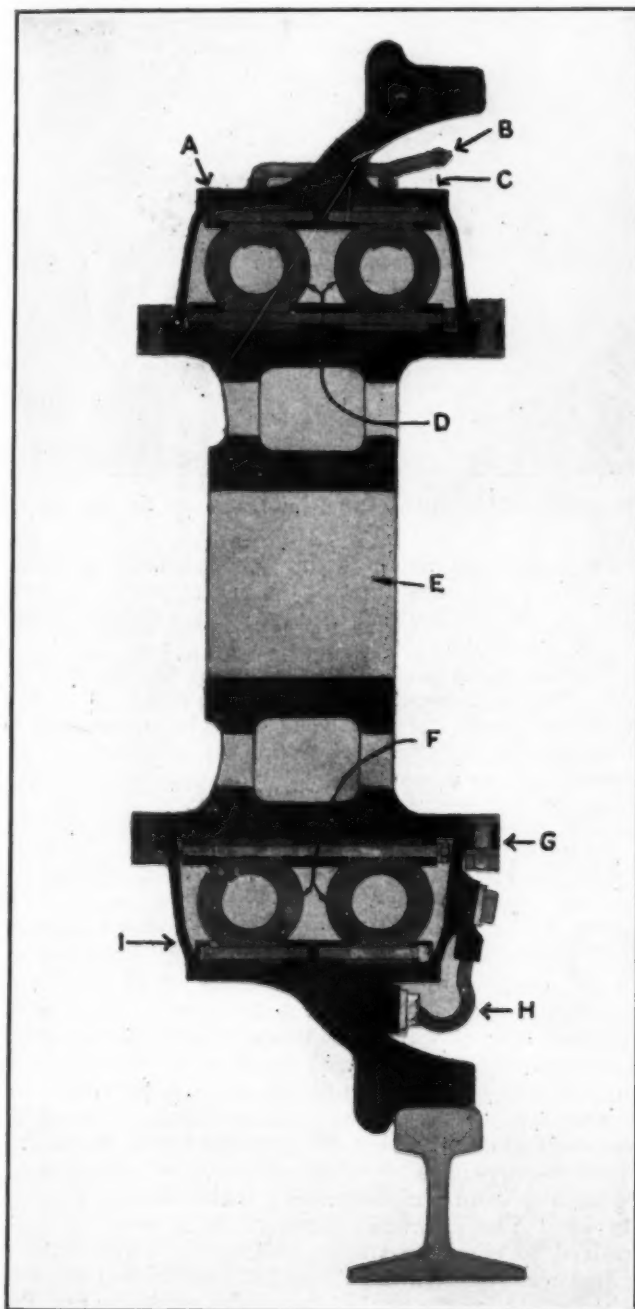
Individual seats are provided for the passenger, the cushions, backs and iron sides being upholstered in genuine leather. They are constructed with removable seat cushions and backs. The driver's seat is mounted on an adjustable base. Tie-back curtains, made of material to harmonize with the interior trimming, are mounted on nickel-plated rods over the side windows. The interior is lighted with dome lights placed in the ceiling. Green running lights are located on each end of the sign box on the front of the body, and two red marker lights on the rear of the body. A built-in step light is located at the right of the front entrance. The bus is equipped with a combination stop and tail light, which also provides light for the license plate, set in a recess directly underneath the light. The sign box above the windshield is fitted with a glass front and is lighted with three lamps. The glass of the sign box can be lettered to provide a stationary illuminated sign, or the opening will accommodate the standard Hunter roller sign. A buzzer signal is operated with cords placed along each side of the interior.



Interurban Chair Car with Body Built by the Brown Body Corporation

Pneumatic Tire Enclosed in the Wheel Hub

IN an effort to eliminate as much as possible the destructive body vibration caused by the wheels passing over road irregularities, the Hatfield Resilient Wheel Company, 342 Guilford avenue, Baltimore, Md., has placed on the market a wheel which has encased around the hub, one or more pneumatic tires, depending

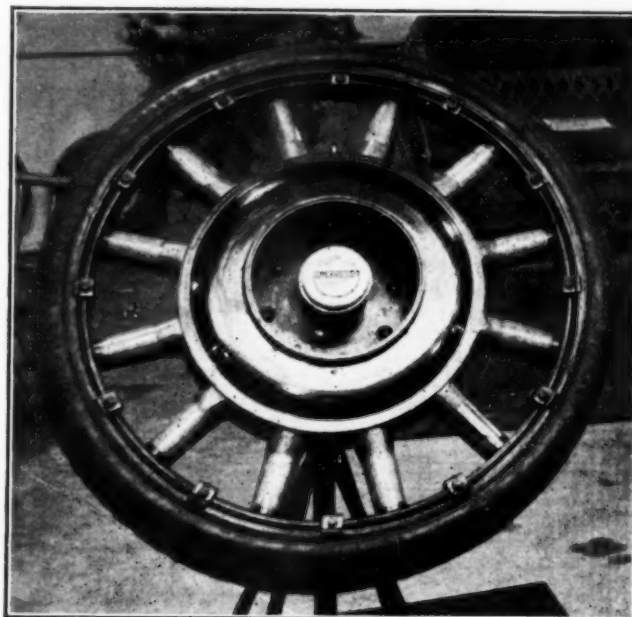


The rim is free to move vertically at A and C in the two tubes; pressure in the two tubes is equalized at B; the fabric tubes at D and F are securely bolted to the two parts of the wheel; the steel cover plates I, which prevent lateral motion, are secured to the wheel center at G; H is a ground connection for electrical equipment.

The Hatfield Wheel Adapted to Rail Car Use

on the service for which the wheel is intended. The automobile wheel is made up of a hub and an outer wheel. The outer wheel consists of a solid tire, rim and spokes and the inner wheel of the spoke socket band, the pneumatic tire or tires and the hub. The fabric

tire, which has an air space 2-in. in diameter, is flanged on the top and bottom. The top flange is secured to the spoke socket band by 12 bolts and the lower flange is secured to the steel hub ring by 12 bolts. The band containing the spoke sockets is free to move vertically



A Solid Tired Automobile Wheel with the Pneumatic Tire Encased Around the Hub

between the two edges of the steel side plates which form the outside surfaces of the inner wheel. When two tires are used, the pressure is equalized in both by the dual connection to an air locking valve stem.

The pneumatic hub tire is enclosed in a steel jacket and is thus protected from oil, light, heat and road friction, which increases the life of the rubber and effectively prevents punctures.

The sectional view shows the adaptation of the Hatfield wheel for use on rail cars. While the hub and rim construction are unlike the motor vehicle wheel, the method of applying the pneumatic tubes is practically the same on both types.

Ticket and Auditing Machine Simplifies Collections

THE Ohmer Fare Register Company, Dayton, Ohio, has placed on the market a new type of ticket-printing and fare register which has been especially designed for the requirements of bus and electric railway service. This machine has a capacity for registering from 1 to 999 zones or stations and for registering fare charges of from 1 cent to \$9.99. The tickets issued within these capacities are similar in many respects to the tickets sold at stations. On them are printed the date, the stations for transportation between which they are sold, the direction in which they are to travel, the amount of fare and the serial number. A precise duplicate of the data printed on the tickets is printed on the record sheet in the machine and, in addition, the record sheet shows the number of the machine and the number of the conductor who operates it.

In Fig. 1 are reproductions of 17 tickets issued from the machine by the conductor. These tickets are numbered consecutively, beginning at the top with the number 2089 and concluding with 2073, inclusive. They are

all dated May 11, 1926. The figures under the arrows represent the stations between which the service is to be rendered. The price of each ticket is printed under "Fare." The letter "S" or "N" indicates the direction in which the vehicle is moving.

The first ticket shows that the passenger boarded the bus at station No. 4 and that 35 cents was collected. The first ticket taken out of the machine is held by the

THE PEOPLES TRANSP. CO. GOOD ONLY FOR ONE CONTINUOUS PASSAGE BETWEEN STATIONS AS INDICATED BY ARROW									
PLEASE RETURN TO OPERATOR UNFOLDED ON ARRIVAL AT DESTINATION									
Reg. No. 104									
FROM TO									
DATE	↓	↓	↓	↓	FARE	CLASS	NUMBER		
MAY 11 26	4S	1	\$0.35				2089		
MAY 11 26	5S	1	\$0.50	EXP			2088		
MAY 11 26	5S	1	\$0.00	MIL			2087		
MAY 11 26	6S	5	\$0.08	SCH			2086		
MAY 11 26	8S	1	\$0.70				2085		
MAY 11 26	10S	2	\$0.00	TIC			2084		
MAY 11 26	10S	9	\$0.00	TRN			2083		
MAY 11 26	15S	2	\$0.00	PAS			2082		
MAY 11 26	99S	1	\$3.99				2081		
MAY 11 26	5N	11	\$0.00	COM			2080		
MAY 11 26	5N	8	\$0.15	SCH			2079		
MAY 11 26	4N	10	\$0.55				2078		
MAY 11 26	3N	15	\$0.58	HF			2077		
MAY 11 26	3N	15	\$0.00	RT			2076		
MAY 11 26	2N	12	\$0.00	TIC			2075		
MAY 11 26	2N	10	\$0.80				2074		
MAY 11 26	1N	99	\$3.99				2073		
2MAY 11 26	4S	1	\$0.35				2089	104	
2MAY 11 26	5S	1	\$0.50	EXP			2088	104	
2MAY 11 26	5S	1	\$0.00	MIL			2087	104	
2MAY 11 26	6S	5	\$0.08	SCH			2086	104	
2MAY 11 26	8S	1	\$0.70				2085	104	
2MAY 11 26	10S	2	\$0.00	TIC			2084	104	
2MAY 11 26	10S	9	\$0.00	TRN			2083	104	
2MAY 11 26	15S	2	\$0.00	PAS			2082	104	
2MAY 11 26	99S	1	\$3.99				2081	104	
2MAY 11 26	5N	11	\$0.00	COM			2080	104	
2MAY 11 26	5N	8	\$0.15	SCH			2079	104	
2MAY 11 26	4N	10	\$0.55				2078	104	
2MAY 11 26	3N	15	\$0.58	HF			2077	104	
2MAY 11 26	3N	15	\$0.00	RT			2076	104	
2MAY 11 26	2N	12	\$0.00	TIC			2075	104	
2MAY 11 26	2N	10	\$0.80				2074	104	
2MAY 11 26	1N	99	\$3.99				2073	104	

Fig. 1.—Reproduction of Tickets Issued by the Ohmer Machine, Showing the Record for Auditing Directly Below

conductor or preferably placed in a conspicuous position for the observation of inspectors when they board the car. All tickets issued thereafter must be numbered in excess of the first serial number. The tickets are issued either for a cash payment of a fare or in exchange for a ticket or other fare medium which entitles the passenger to ride.

It is impossible with this machine to issue two tickets with the same consecutive number, each ticket being definitely distinguished from all others by its num-

ber. The tickets issued must be returned by the passengers to the conductor upon arrival at destination. The record in the machine discloses and identifies all the



Fig. 2.—The Machine Mounted for Operation by the Driver

tickets issued and may be used by the cashier or auditing department as a substitute for the tickets to clear the returns of the conductor in case any of the tickets should be lost or misplaced.

The size of this machine is 6½ in. by 6½ in. by 8 in. and it may be carried by the conductor, slung on a strap around the neck, so that the machine hangs directly in front, or can be placed on a bracket alongside of the driver's seat, as shown in Fig. 2. The weight of this machine without the bracket is 10 lb.

Multibestos Bus Brake Lining

ONE of the products of the Multibestos Company, Walpole, Mass., is a brake lining designed especially to meet the requirements of truck and bus service. This lining, which has been on the market for some time, is woven from hard-twisted asbestos yarn combined with soft annealed brass wire. It is said to contain 20 per cent more fibred asbestos yarn than the regular type of passenger car brake lining. During the manufacturing process it is compressed and thoroughly impregnated with a chemical compound of special composition to insure braking ability under all conditions of service. The chemical treatment is a secret process evolved to eliminate rubber compounds which tend to soften and run out when heated. The finished product, when ready for the market, bears size markings and foot marks every 12 in. as an added convenience in measuring.

This company has also developed a complete motor-driven brake lining machine, which will punch out the old rivets, drill and countersink the new lining at one operation, and head over the new rivets. This device is of sturdy construction throughout, simple to operate and efficient work can be done even by an inexperienced operator. The work is in plain sight of the operator at all times. In addition to handling truck shoes and clutch discs for heavy duty service, this device will also handle passenger car brake bands and Ford transmission bands.

Motor Transport News

Night bus service between New York and Boston has been established by the Gray Line. Buses leave the termini at 9 p.m. and are due to arrive at 8 a.m.

Motor transportation is one of the growing industries of Montana, according to the assistant secretary of the railroad commission. There are now 76 concerns operating over the highways as common carriers in the state, 22 of these being exclusively freight lines, 26 passenger lines and 22 both freight and passenger lines.

The constitutionality of the Kentucky automobile license law which provides that state truck owners operating over the highways of Kentucky must pay for a Kentucky license tax, is to be tested as the result of an order of Chief Justice Thomas of the Court of Appeals at Frankfort. At the present time a temporary injunction restrains the enforcement of this law by the state tax commission.

The fare for bus transportation between Detroit, Mich., and Toledo, Ohio, originally established at \$1.75 one way, was reduced to 20 cents one way and 30 cents round trip in a recent rate war between two competing bus lines. The distance between the two cities is approximately 55 miles. After a short period of heavy business under such low rates, the fares were fixed at 75 cents one way by both companies, but one of them shortly afterward again reduced its fare to 50 cents.

Swiss Railways Enter Motor Transport

The Swiss Federal Railways, led on to action (says the Times-London) by serious declines in net revenue, due in part to motor transport competition, have subscribed 51 per cent of the capital stock of a new company to be known as the "Sesa," which will operate motor vehicles on the highways in co-ordination with the railways.

Reading Gets Its First Permit

The Reading, which for a year has had planned a comprehensive system of motor coach operation in co-ordination with its train service, has received its first certificate of convenience and necessity from the Public Service Commission of Pennsylvania. The route over which motor coach operation is authorized in this permit is that from Doylestown to Lansdale; it is approximately 10 miles in length.

N. S. W. Railways Use Trucks in Freight Service

The New South Wales Government Railways have placed a fleet of 20 four-ton Leyland motor trucks in service at their Darling Harbor terminal to deliver wool to consignees in the vicinity of that terminal. Prior to this the deliveries had been made by a private firm with horse teams, but increasing traffic and consequent congestion made that form of transportation too slow. At the close of the wool season it is proposed to utilize the motor trucks for the transfer of less-than-carload traffic within the radius of the terminal.

Suburban Bus Terminals for New York Planned

Three or more central terminals for independent motor buses operating between New York and suburbs in New Jersey, Long Island and Westchester county, will be built in New York City, according to reports. These terminals, it is said, will be ready for use some time in 1928.

A terminal will be built west of Broadway for New Jersey buses and east of that thoroughfare for Long Island motor lines, while another will be centrally situated for Westchester county travelers. The stations, according to plans, will be underground, with elevator systems for raising and lowering the cars.

Pennsylvania Receives Another Permit

The Pennsylvania, in the person of F. J. Scarr, its supervisor of motor service, has received a certificate of convenience and necessity from the Public Service Commission of Pennsylvania authorizing the installation of motor coach service between Manor, Pa., and Boquet.

Officers of the railroad have conferred with residents of Bradford, Pa., to learn their attitude on a substitution of motor coach service for train service between that place and Olean, N. Y. Inasmuch as the citizens expressed themselves as favorably inclined to such a change, provided the new service were operated by the Pennsylvania, it is probable that the motor coach service will be installed.

Mr. Scarr, representing the railroad, has withdrawn his application for a bus permit for the Cadiz-Uhrichsville route in Ohio.

Long Island Secures Injunction

Against Competing Bus Line

The Long Island Railroad has won its application for an injunction against an independent bus operator to restrain it from conducting a bus line between New York and Glen Cove and other points in that vicinity on Long Island.

The opinion of the court said that the bus company began to operate on April 1, causing considerable loss to the railroad because of its competition. The railroad sued on the ground that the bus line had not obtained permission from the authorities as required under the law, and showed that there was a loss in sales at its Glen Cove ticket office of \$800 in April and May, when the defendants were carrying only 4,000 passengers a month. In September the buses carried 17,000 passengers.

The bus company applied last May to the Public Service Commission for permission to operate from Forty-fifth street and Broadway, New York, to Glen Cove, but the application was denied on the ground that the company did not intend to carry any local passengers between any two points in Nassau county, for which reason public convenience and necessity would not be served.

Sweeping Motor Vehicle Regulation

Law Passed in Oregon

A popular referendum in the State of Oregon recently passed a law on bus and truck regulation and taxation which is most complete in its provisions. The law requires all motor carriers of persons and property not operating wholly within incorporated cities to have permits to operate from the Public Service Commission and classes them all as common carriers. School buses only are excepted from this rule. Permits may be granted for four years and then may be renewed. To secure permits applicants must satisfy the commission of their capability and responsibility and liability and property damage insurance to amounts prescribed by the commission must be provided as also must a good faith policy.

The motor carriers are required by the law to file tariffs and free or reduced rates are subject to the same rules covering rail carriers. Books must be kept in forms prescribed by the commission and tax reports and remittances are required monthly. The law provides for a special revenue of three-fourths of a mill per passenger seat a mile for the distance traveled by buses in regular passenger service and one mill per ton mile for the authorized run of truck service on the total freight tonnage permitted to be carried by the truck. The Spokane, Portland & Seattle, which operates a fleet of buses in Oregon, has not yet determined just what the effect of the law will be on it but the cost of operation will necessarily be increased.

Destructive Competition of Bus

Line with Railroad Disapproved

An automobile stage line operator obtained an order from the Utah Public Utilities Commission authorizing him to operate his line for passenger and express service, between Salt Lake City and Fillmore, on his statement in his filed schedule that he would make one trip each way a week. Immediately after the order became effective he filed with the commission a schedule proposing to make daily trips. Certain railroads affected pro-

tested (the L. A. & S. L., D. & R. G. W. and Salt Lake & Utah) and the commission declined to approve of the additional service. The Utah Supreme Court has affirmed the orders of the commission. Commenting upon the way a railroad running from a central point like Salt Lake City to some outlying and undeveloped territory may be affected by the competition proposed, the court said: "In making the weekly trip he may not seriously have affected the receipts of the railroad, while in making daily trips he may so reduce its receipts as to make it impossible to pay the operating cost of the railroad. Its rates must thus be increased or it must go into the hands of a receiver, while the bus line is reaping a large reward by serving only territory already served by the railroad company. The railroad rates may thus have to be increased to such an extent that those living in the sparsely settled territory can no longer afford to pay the rates, and thus development must cease altogether."—*Gilmer v. Public Utilities Commission (Utah)*, 247 Pac. 284.

Colorado Utilities Commission

Given Control Over Highway Transport

The Supreme Court of Colorado has ruled that the State Public Utilities Commission has jurisdiction over every person or corporation owning, controlling or operating motor vehicles for transporting persons or property for compensation, and in accordance with such ruling has issued the following rules and regulations:

The granting of any permit to operate a motor vehicle for compensation, either for the transportation of persons or property, shall not be deemed an exclusive grant or monopoly.

Temporary permits to operate will be given after informal hearings. Tariffs, classifications and time schedules must be filed with the commission, just as are those of railroads.

Abandonment of service established under the rules will not be allowed except on permit.

All accidents must be reported in writing to the commission.

Quarterly and annual reports of business must be made.

All state motor vehicle laws must be complied with fully before a certificate or permit will be issued.

Motor vehicle carriers must be properly labeled, and must display the number of their public utility permit.

Buses must be equipped for reasonable comfort.

A schedule of insurance will be fixed and liability insurance policies must be filed with the commission and must not expire except on 10 days notice to the commission. Disobedience of the rules will result in immediate suspension and possibly the revocation of permits, and no operation of motor vehicles under the definitions established will be permitted without the proper permit.

B. & M. Offers Container Service

A further co-ordination of motor truck and freight train service, by the introduction of steel freight containers which are interchangeable between truck and train, has been inaugurated by Boston & Maine between Boston, Mass., Worcester and Springfield. This shop-door to store-door pick-up and delivery system, through which an overnight service will be given each of these cities by the Boston & Maine, is being conducted under the auspices of the Boston & Maine Transportation Company, the road's highway subsidiary. It may be extended shortly to several other cities on the Boston & Maine lines.

The 5-ton steel containers may be loaded inside the shipper's place of business in Boston, locked securely, transferred by truck any time before 6.30 p. m. to specially equipped cars on railroad, and placed for delivery at warehouse, shop or other place of business, at Worcester or Springfield, before opening next morning. The freight trains handling this business under the new schedules will arrive at Boston, Worcester and Springfield at or before 6 a. m.

The container service may be by movement of containers to and from individual plants which will use them exclusively, by package service operations in which the containers are placed at some central point in each city to take packages for some other city, or by truck operations on a route with calls to collect or deliver shipments at various plants. The Freight-Container

Service Company supplies the containers and the motor trucking service.

The containers used in the new Boston & Maine service are double locked and sealed, with a master key in the possession only of the agents at each terminal. The specially equipped flat cars of the railroad will carry five of the 5-ton containers, and the containers themselves are fitted with casters by which they are rolled from truck to flat car, and reverse.

Orders for Equipment

THE YAKIMA VALLEY TRANSPORTATION COMPANY, a subsidiary of the Union Pacific, has purchased two 29 passenger Mack city type buses from the International Motor Company for operation in the vicinity of Yakima, Wash.

Among the Manufacturers

H. L. Beckwith has been appointed manager of the factory branch of the General Motors Truck Company at Toledo, Ohio.

R. Hallam has been appointed branch manager of the Mack-International Motor Truck Company, with headquarters at Milwaukee, Wis., where a new branch building has recently been completed.

A new company has been organized by E. W. Bassick and W. R. Bassick, both of Bridgeport, Conn., E. S. Evans, Detroit, Mich., and M. H. Furlaud, New York, and has acquired the capital stock of Service Motors, Inc., Wabash, Ind. It will manufacture motor buses and trucks embodying a new type of final drive, known as the relay axle drive. This axle has been manufactured in the past by the Commerce Motor Truck Company, Ypsilanti, Mich., and it is planned to consolidate the two companies at Wabash. G. L. Gillam, president of Service Motors, Inc., and W. R. Bassick, president of the Commerce Motor Truck Company, will be officers of the new corporation. M. A. Holmes, sales manager of the Commerce Motor Truck Company and formerly sales manager of the Republic Truck Company, will be in charge of sales of the new corporation.

Trade Publications

MACK GAS-ELECTRIC BUS.—The International Motor Company has issued a complete bus catalog number 95 and a pamphlet describing the new six-cylinder Mack bus.

INTERNATIONAL HARVESTER-WESTINGHOUSE GAS ELECTRIC MOTOR BUS.—Westinghouse folder 4729 describes the new gas-electric motor bus built by the International Harvester Company and completely electrically equipped by the Westinghouse Electric & Manufacturing Company.

MILEAGE RECORDS OF WHITE TRUCKS AND BUSES.—The White Company, Cleveland, Ohio, has published a booklet listing all owners of White buses and trucks that have been operated in excess of 100,000 miles. The owners of White equipment which have exceeded this mileage number 8,024. Nine hundred fifty-one Whites have run more than 200,000 miles, 384 have exceeded 300,000 miles, and 72 have passed the 500,000 mile mark.

"NEWS REGARDING TRANSPORTATION."—The American Car & Foundry Company has begun the publication of a bulletin called "News Regarding Transportation" which will contain discussions of various phases of the modern transportation agencies: railways, highways, waterways and airways. It will also summarize the outstanding developments in the steam railway field. The first issue contains a statement of the purpose of the publication by W. H. Woodin, president of the American Car & Foundry Company. There are also a number of statements of railway executives regarding the railroad attitude toward motor transportation, an article on the reasons for the entrance of the company into the motor field, excerpts from newspaper editorials commenting on railway service and reports on records of railway efficiency and equipment installed on the railways.

Two Sections—Section Two

Railway Age



Motor Transport Section

*Devoted to the
Co-ordination of Railway and Highway Service*



SECOND HALF OF 1926. No. 26

NEW YORK—DECEMBER 25, 1926—CHICAGO

SEVENTY-FIRST YEAR



A. C. F. Motor Coaches

For Complete Details see January 1st Railway Age
Pages 35 to 42 Inclusive



Over the hills on rubber rails

WITH the evolution and constant progress in the field of modern transportation, many of the recognized leaders in the railroad field are finding a greater economy in the use of rubber rails.



Just as Westinghouse Air Brakes have been synonymous with steam road success—so have Westinghouse Automotive Air Brakes, in their own field, made possible the safe use of modern heavy motor vehicles, with their necessary bulk, at speeds rivaled only by the railroads themselves.

Keeping pace with the great forward strides in highway transportation, the Westinghouse Automotive Air Brake is now making possible typical railroad security for highway vehicles.

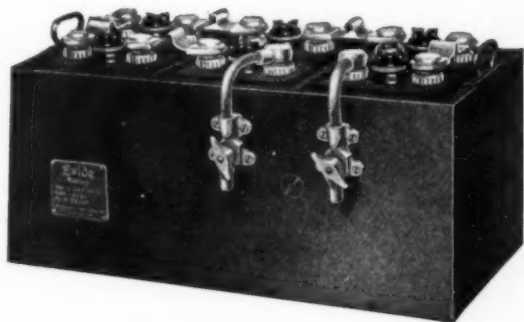
Westinghouse Air Brakes have been a potent factor in the development of the larger conveyances, and their adoption as standard equipment on the products of the foremost manufacturers of motor transports is a true recognition of a faithful service.

WESTINGHOUSE AIR BRAKE COMPANY
Automotive Division, Wilmerding, Pa.

WESTINGHOUSE
AUTOMOTIVE AIR BRAKES

Built to stand the gaff

*Here is a battery built to meet the exacting requirements
of the most difficult automotive service*



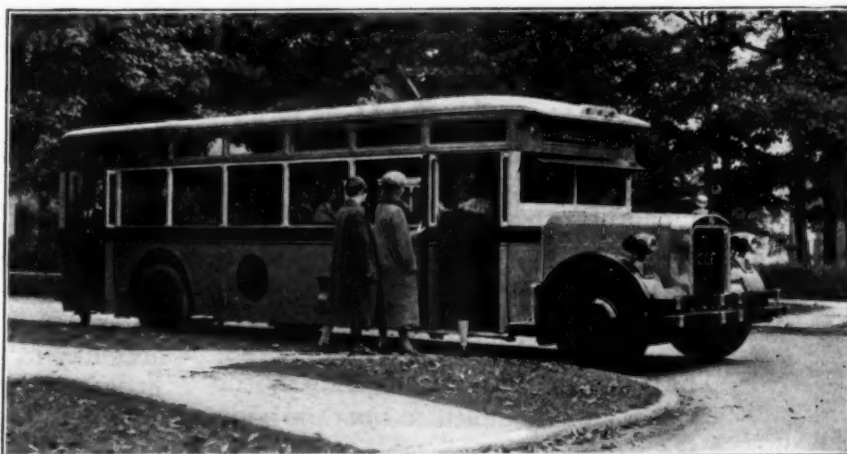
The Exide Motor Coach Battery, Type K X K, specially designed for motor coach service.

PROVIDE now for unfailing battery service during the long nights of winter operation. With shorter days, your coaches will be putting in more running hours after dark. Equip them with a battery that you can be sure has plenty of capacity to handle the extra lamp load—the Exide Motor Coach Battery.

The Exide Motor Coach Battery is built to do its job all year round. Exide engineers have designed it specially to meet the heavy demands of motor coach service—the hardest battery service in the automotive field. It is built to stand up under long working hours, heavy lamp loads, and the wear and tear of rough going over all kinds of roads. Every part has been designed expressly to insure long, steady, trouble-free service under these conditions.

For example, the cell jars and covers of the Exide Motor Coach Battery are made of Giant Compound, a practically unbreakable material originally designed for railway car-lighting batteries; the cell connectors

New A. C. & F. Gas-Electric Coach, Exide-equipped.



are flexible, to prevent their crystallizing under the vibration; and the plates, which have to stand a strain of almost continuous charge and discharge, are made extra-heavy.

The plates are further protected by double insulation—one separator of wood and one of rubber—between them. More sediment space has been provided below the plates to give the battery longer life, and more water space above them means less frequent filling.

It is these special features *plus* the well-known Exide reliability that make the Exide Motor Coach Battery the most efficient and economical battery for motor coach service. It is by far the best battery investment for motor coach operators.

Send for our booklet, "Exide Batteries for Motor Coaches and Buses," which describes its advantages in detail.

Exide MOTOR COACH BATTERY

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

Exide Batteries of Canada, Limited, Toronto



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With Dual Rear, Optional)

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STREET CAR TYPE - \$3815
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PARLOR COACH . . 3750

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Railway Age

Motor Transport Section

Devoted to the
Co-ordination of Railway and Highway Service

Vol. 81 December 25, 1926 No. 23



Co-ordinated Transportation on the Boston & Maine

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The Railway Age is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).



Photo from Ewing Galloway

Scene at Promontory Point, Utah, May 10, 1869. Driving the last spike of the Union Pacific transcontinental railroad.

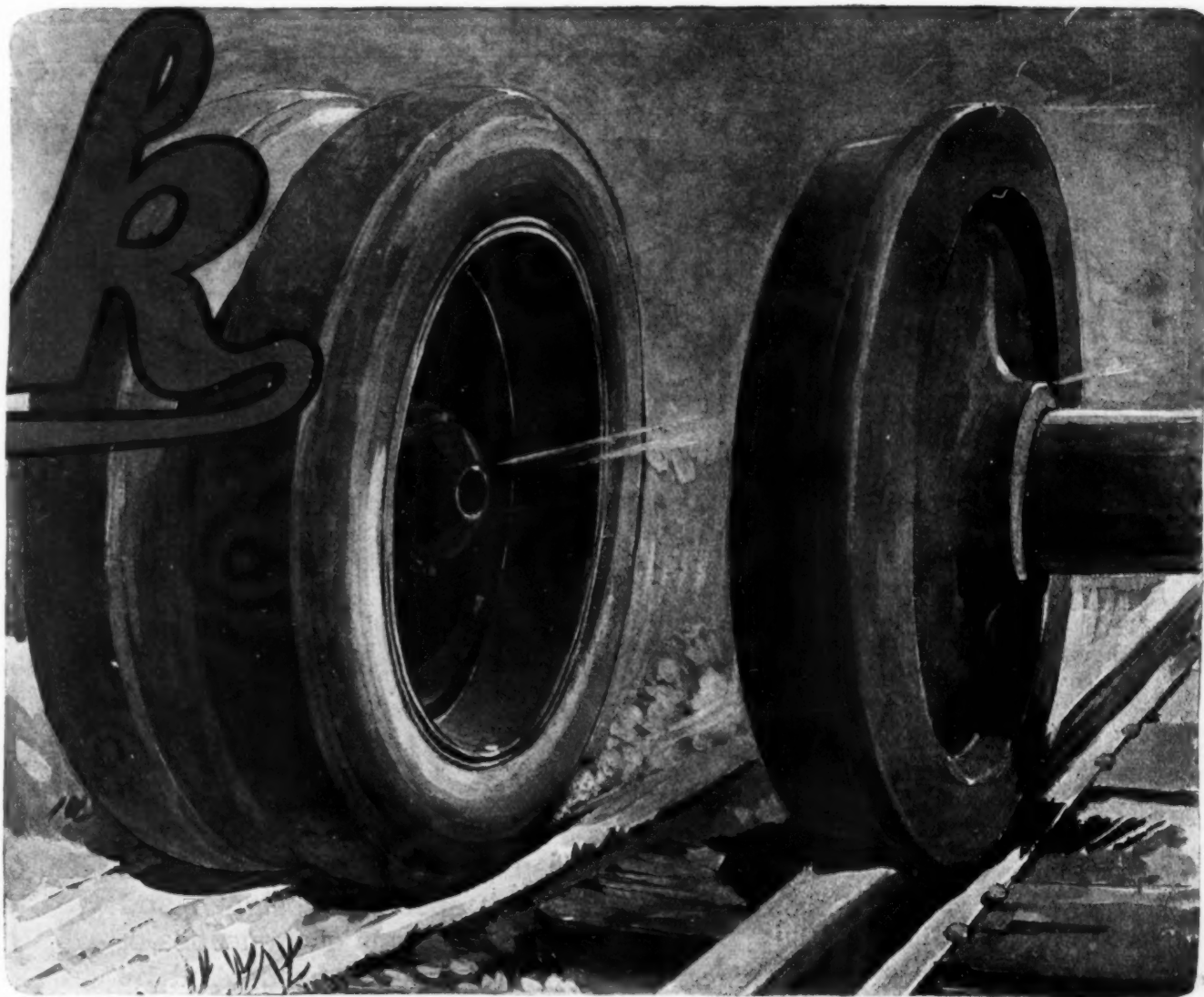
Progressive Transportation

WHEN the approaching ends of the original transcontinental railroad came together, the last stroke of the sledge on a spike of gold marked the beginning of a transportation era that was destined to reach out far beyond the most visionary mental picture of any official taking part in that memorable celebration.

Although only fifty-seven years have elapsed, progress today has again launched us well into a second era, one that might be termed "Coordinated Rail and Highway Transportation",

international in its scope and also having a future that no man can accurately forecast.

However, as we live in the present and progress but one day at a time, the question of what vehicles are holding and will continue to hold a clearly defined position in the vanguard of this modern scheme of coordination, can be answered by referring to their past records; in other words, to the positions that they have consistently held in the various branches of highway transport work during the past twenty-six years.



~ COORDINATION ~

**Though their paths differ
their interests are firmly
welded**

MACK TRUCKS, INC.

International Motor Company

25 Broadway New York City

One hundred and four direct Mack factory branches operate under the titles of: "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION", "MACK MOTOR TRUCK COMPANY", or "MACK TRUCKS OF CANADA, LTD."



The illustration shows a 21-Passenger Suburban Body mounted on a White Model 53 chassis with 180" wheelbase.

Bus Bodies for Any Transportation Need

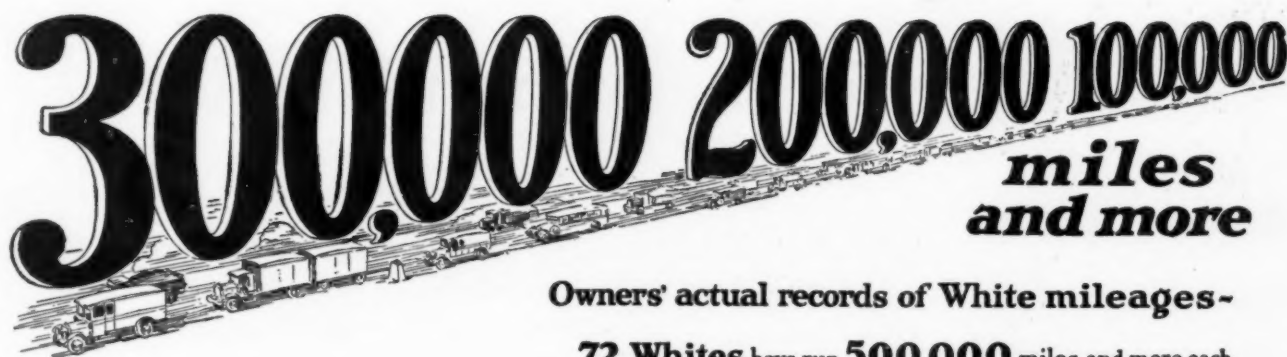
THE operator of Baker-Raulang Bus Bodies buys far more than comfortable, attractive buses. He buys bodies specially designed and skillfully built to carry hundreds of thousands of passengers at minimum upkeep cost. And he buys a complete body engineering, sales and manufacturing service, backed by 73 years experience, capable of working with him to solve any bus body problem no matter how complex.

Baker-Raulang improvements, service, experience can be of particular value to the large operator as well as to the smaller user. Baker-Raulang Bus Bodies are made in the City Pay-Enter type, Parlor Chair type and all intervening types to meet special requirements. Catalogue No. 201 illustrates many types and improvements in which every operator should be interested.

THE BAKER-RAULANG COMPANY • Bus Body Division • CLEVELAND, OHIO



300,000 200,000 100,000 miles and more



Owners' actual records of White mileages—

72 Whites have run **500,000** miles and more each
384 have run between **300,000** and **500,000** miles each
951 have run between **200,000** and **300,000** miles each
1658 have run between **150,000** and **200,000** miles each
4959 have run between **100,000** and **150,000** miles each

giving the astounding total—

8024 Whites have run **100,000** miles and more each



No owner will operate a truck or bus long enough to run 100,000 miles, unless those miles are *money-earning miles*

100,000 miles—White miles—mean more than an exceptionally long distance; more than an exceedingly durable, well-built, well-serviced motor truck or bus.

They mean unusual profits. They mean net earnings—in excess of all costs. They mean continued earnings long after the original cost has been written off the books.

200,000 miles mean all that—doubled. 300,000 miles mean all that—trebled. So on . . . Picture the earnings of the scores of Whites that have exceeded 500,000 miles. Then picture what these mileages would mean in your own business, knowing your average mileages for a week or a month or a year.

White 100,000-mile records are not isolated performances, not special achievements under especially favorable conditions. Whites, by the thousand, exceed 100,000 miles with a regularity that makes it standard performance. . . . All models do it. They do it in all lines of business. They do

it everywhere, under all conditions of load, road, weather and climate. They do it in fleets and in single installations.

More than 8,000 Whites have run 100,000 miles and more. More than 1,400 have run 200,000 miles or more. More than 400 have exceeded 300,000 miles. The original cost of most of these 8,024 Whites has been written off the owners' books. . . . And these mileages are actual owners' figures. They do not include many hundreds of additional Whites that have passed 100,000 miles, but whose owners have not sent us accurate records. Neither do they mirror the splendid earning records of thousands of Whites that have been serving dependably for ten, twelve, fourteen years, carrying their pay loads, without reaching the 100,000-mile mark.

This record, published annually, stands alone. No other truck manufacturer has ever published such a volume of evidence of dependability, long life and continuous earning power. No other truck manufacturer can.

THE WHITE COMPANY, CLEVELAND

Our new "300,000 Miles and More" booklet is just out, with the names of all the owners and the number of Whites each owns in each mileage classification. You will find leaders in all industries, firms in your own line of business, your neighbors, your business associates. We will gladly send the booklet free. Write for it.

Before you buy a truck or a bus see the Whites at any of our 75 factory branches or 500 dealers. There is a White model to meet every transportation need.

Truck Chassis	
Model 15 — ¾-Ton.....	\$2,150
Model 20 — 2-Ton.....	2,950
Model 51 — 2½-Ton.....	3,750
Model 40-A — 3½-Ton.....	4,350
Model 52 — Heavy Duty.....	5,100
(Several types of power dumping bodies and hoists available)	
Bus Chassis	
Model 53..... 16 to 21 passengers.....	\$4,250
Model 50-B..... 25 to 29 passengers.....	5,350
(All prices f.o.b. Cleveland)	

WHITE TRUCKS

and WHITE BUSES

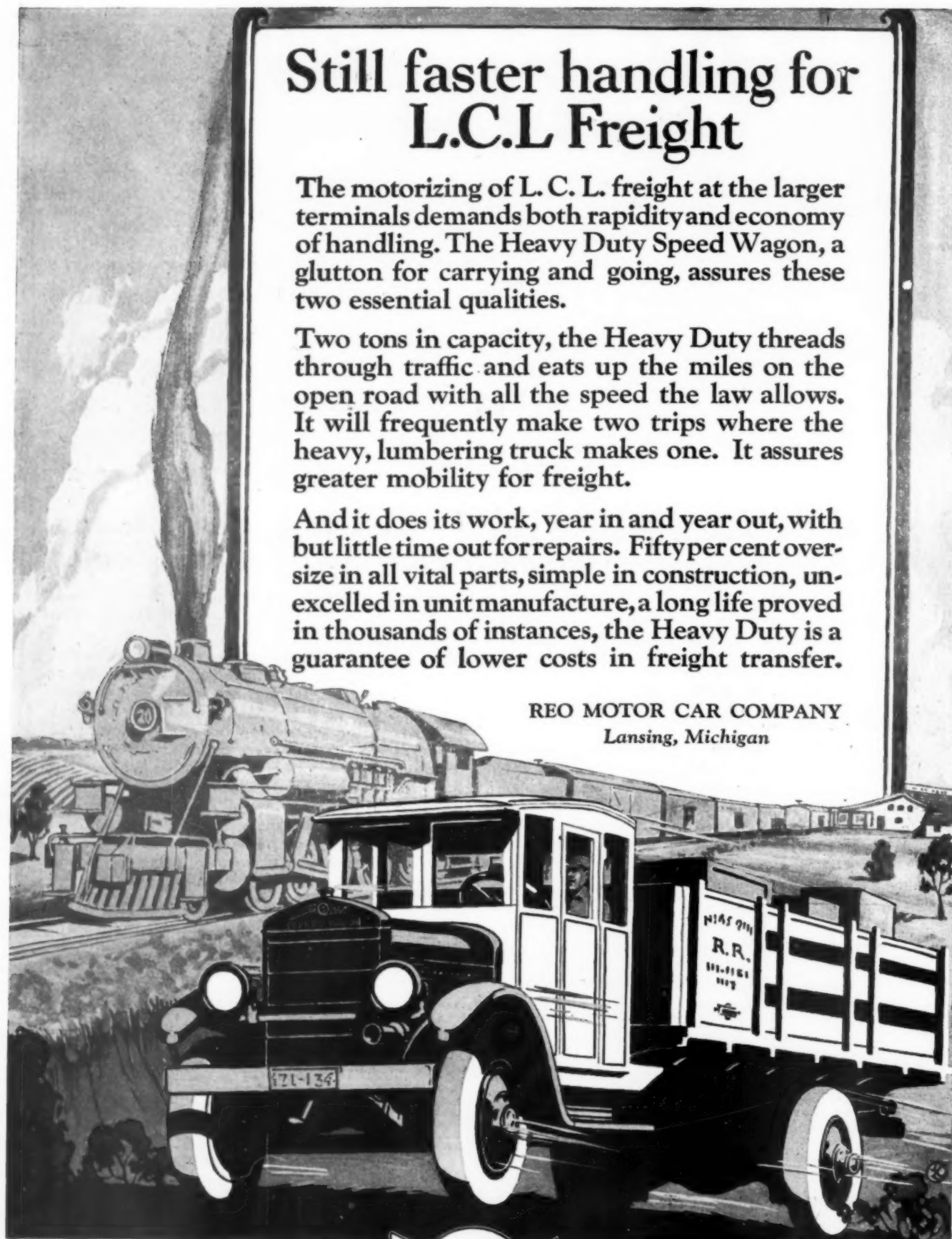
Still faster handling for L.C.L. Freight

The motorizing of L. C. L. freight at the larger terminals demands both rapidity and economy of handling. The Heavy Duty Speed Wagon, a glutton for carrying and going, assures these two essential qualities.

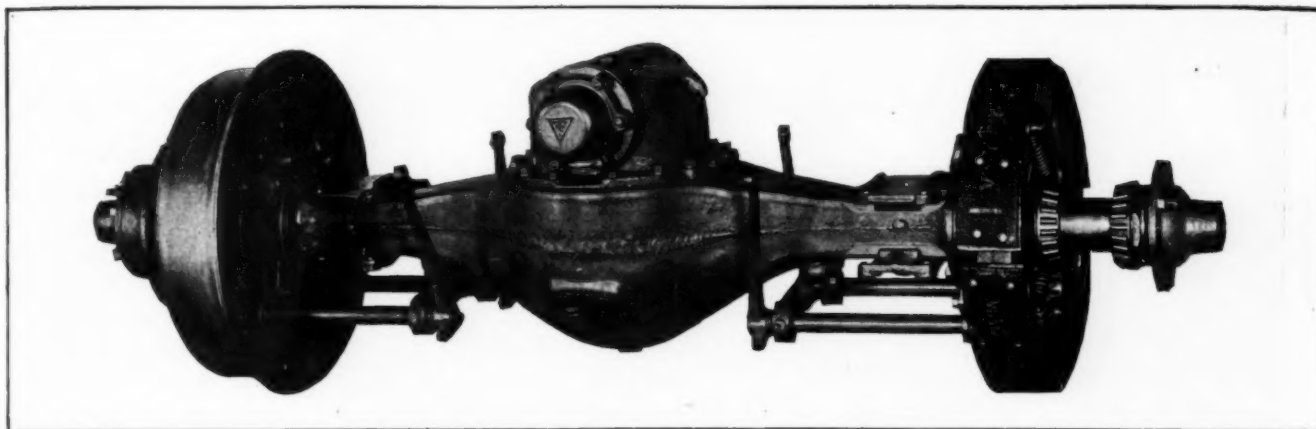
Two tons in capacity, the Heavy Duty threads through traffic and eats up the miles on the open road with all the speed the law allows. It will frequently make two trips where the heavy, lumbering truck makes one. It assures greater mobility for freight.

And it does its work, year in and year out, with but little time out for repairs. Fifty per cent over-size in all vital parts, simple in construction, unexcelled in unit manufacture, a long life proved in thousands of instances, the Heavy Duty is a guarantee of lower costs in freight transfer.

REO MOTOR CAR COMPANY
Lansing, Michigan



SPEED WAGON



It looks the part!

Clean cut and business-like is the appearance of a Timken Axle. Accurate engineering! And so—whether measured in ton miles or passenger miles—the service delivered by Timken Axles is invariably in excess of expectations.



THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

TIMKEN AXLES



De Luxe Bus with Hale-Kilburn Luxurious Seats

**HALE-KILBURN
Bus Seats**

while specially built for Bus Service, embody the same features of inherently good design, handsome appearance and utmost comfort that have made *Hale and Kilburn Car Seats* famous for half a century.

Your Own Experience As A Bus Seat Buying Guide

Every Railway Official Knows HALE-KILBURN Car Seats



Typical Bus Seat
No. 901 Double Chair.
A graceful, comfortable double chair with divided back and spring cushion pads

They have been standard for years upon most of the principal Railroads of the Country and have always kept pace with Transportation Development.

Railway men know the quality, reliability, simplicity and service of Hale and Kilburn Car Seats.

**You are Safe
in Specifying
Them for
Any Service**



**No. 208
DeLuxe Bus Seat**
Designed especially for bus service, this seat has divided back, spring cushions and air cushion pads upholstered in leather or imitation leather as specified.

HALE-KILBURN COMPANY

General Offices and Works: 1800 Lehigh Avenue, Philadelphia

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Frank F. Bodler, 903 Monadnock Bldg., San Francisco

Chris Eccles, 320 S. San Pedro St., Los Angeles

T. C. Coleman & Son, Starks Bldg., Louisville

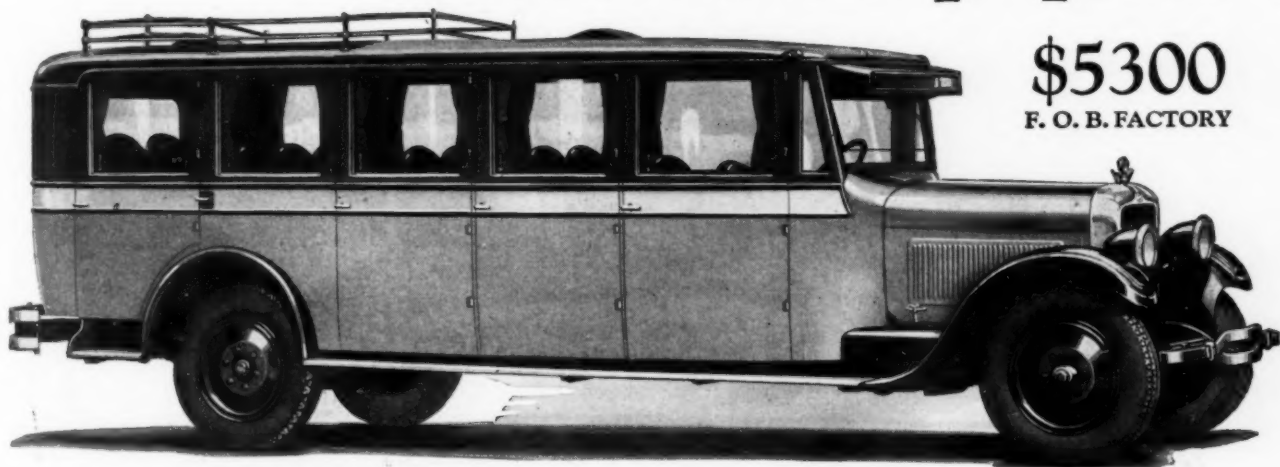
W. L. Jefferies, Jr., Mutual Bldg., Richmond

W. D. Jenkins, Praetorian Bldg., Dallas, Texas

W. D. Jenkins, Carter Bldg., Houston, Texas

Hale and Kilburn SEATS

Bus Patrons Demand Luxurious Equipment



\$5300
F. O. B. FACTORY

*Comfort, Beauty, Luxury and Power are found in this
Studebaker Side Entrance Parlor Car for Eighteen Passengers*

FACTS prove that Studebaker busses are best adapted to profitable city or interurban service.

First, is the low initial cost proved by the fact that two Studebaker busses can be bought for the price of one heavy truck type bus.

Second, is the lower operating cost which is seven to nine cents a mile less for a Studebaker bus than for heavy truck type bus.

Third, is the marked preference shown by bus patrons for vehicles possessing easy-riding qualities and attractive appearance. Passengers gravitate toward Studebaker busses because of the luxurious seats, generous leg room, wide vision windows and because Studebaker busses have a reputation for maintaining their schedules.

The superlative riding qualities of Studebaker busses is the best assurance of continued patronage which means continued profits for the operator.

With the most powerful bus chassis of its size and weight, Studebaker busses glide quietly along the highway, taking long steep grades in high, with a smoothness attainable only by an accurately balanced six-cylinder power plant in which vibration is practically eliminated. The long, resilient springs and the oversize tires cushion every road shock. The smooth acting four-wheel hydraulic brakes enable the driver to thread heavy traffic or, on the open road, to travel at permitted speeds with reassuring safety.

Completely Equipped

There is nothing to buy that will add to the driving comfort or facilitate the operation of this bus. The equipment is complete and includes: stop signal system; illuminated destination sign (above windshield); automatic windshield cleaner; rear-view mirror; front and rear bumpers; motometer; extra wheel with tire, tube and cover, mounted on left front; 8-day clock and gasoline gauge, plus the usual instruments, mounted in an oval group under glass; inspection lamp with 10-foot cord. Lights are controlled by a steering wheel switch.

Most Powerful Bus Chassis of Its Size and Weight

Based on the rating of the Society of Automotive Engineers, the Studebaker bus chassis is the most powerful of its size and weight in the world. There are 66 bus chassis on the market with more weight per horsepower than the Studebaker chassis.

The chassis is sturdily built, with surplus strength. It is not a heavy truck-type chassis—nor a passenger car chassis which has been lengthened and therefore weakened by splicing. Extra safety factors include: staunch frame braced by eight stout cross-members; large rear axle shaft; oversize propeller shaft; sturdy, resilient springs; special disc bus wheels and four-wheel hydraulic brakes.

As proved by nearly 300 Studebaker busses with records of more than 100,000 miles, this chassis gives literally scores of thousands of miles of thoroughly dependable service at exceptionally low operating cost—and minimum depreciation.

—first cost
—operating cost
—maintenance cost
—depreciation cost

Lower

Six Body Designs, 12 to 21 Passengers \$3935 to \$6150

Prices f. o. b. factory, covering body and chassis, complete. Purchase can be arranged on a liberal Budget Payment Plan—Small down payment and balance in convenient monthly installments.

12-Pass. (including driver) cross-seat Sedan-Type.....	\$3935
15-Pass. (including driver) cross-seat Sedan-Type.....	\$4295
18-Pass. (including driver) side-entrance Parlor Car.....	\$5300
19-Pass. (including driver) cross-seat Sedan-Type.....	\$5050
20-Pass. (including driver) Parlor-Car De Luxe*.....	\$6150
21-Pass. Pay-As-You-Enter Street-Car Type*.....	\$5125

*Includes dual rear wheels

THE STUDEBAKER CORPORATION OF AMERICA Dept. L, South Bend, Ind.

Send me full information on Studebaker Busses without obligation

Name.....
Address.....
City..... State.....
We have.....busses at present.
Check below the Studebaker Bus about which you desire information.
Type: Sedan.....Parlor Car.....Street-Car Type.....
Capacity:.....Passengers.



Built for Extra Mileage In Bus Service

Steep grades; slippery roads; quick stops and starts—Firestone Gum-Dipped Tires assure greater safety, comfort and economy.

Gum-Dipping—saturates and impregnates every fiber of every cord with rubber—builds extra

strength and endurance, while the scientifically designed tread grips the road—and provides positive traction in bad going.

Your Firestone dealer will serve you better and save you money. See him.

MOST MILES PER DOLLAR

Firestone

GUM-DIPPED TIRES

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER *Harvey Firestone*



Where loads are loads and there are no roads

GO TO the oil fields if you want to see trucks hauling loads that are loads—tons on tons of rigging, casing, boilers, pipe. And hauling these loads where roads have never existed—over gulleys, ravines, prairies without a trail, and even over river beds.

Go to the Texas Panhandle—largest oil field in the world—and see International Trucks doing the heaviest kind of work and making light of it. You will find hundreds of them—from the thickest proven territory where the derricks rise like orchards out to the farthest wildcat well.

Here and in the other oil fields—and also in the refining and marketing end of the business, thousands of Internationals are doing the hard work for the most progressive companies of the industry. And wherever

you go you will find International Trucks giving good service and getting good service as well.

Hard service is built into every International by one of the oldest manufacturing organizations in the country. Good service is given to every International by the largest company-owned truck service organization in the world.

Some of the Leading Oil Companies Owning International Trucks

Amerada Petroleum Co.	Indian Refining Co.	Red Fox Petroleum Co.
Cities Service Oil Co.	Leader Oil Co.	Reed Oil Co.
Collins Oil Co.	Lily White Oil Co.	Roxana Petroleum Corp.
Colonial Filling Stations	Magnolia Petroleum Co.	Shafter Oil Co.
Continental Oil Co.	Manhattan Oil Co.	Shell Oil Co.
Cosden Oil Co.	Marland Oil Co.	Sinclair Oil Co.
Economy Gas & Oil Co.	Metro Oil Corporation	Standard Oil Co.
Empire Gas & Fuel Co.	Mid-Continent Ref. Co.	Texas Co.
Great Western Oil Co.	National Refining Co.	Texhoma Oil & Ref. Co.
Gulf Refining Co.	Prairie Pipe Line Co.	Tidewater Oil Co.
Hawkeye Oil Co.	Pure Oil Pipe Line Co.	Waite-Phillips Oil Co.
Imperial Oil, Ltd.	Purity Oil Co.	White Eagle Oil Co.

INTERNATIONAL HARVESTER COMPANY
OF AMERICA
606 SO. MICHIGAN AVE. (INCORPORATED) CHICAGO, ILL.

INTERNATIONAL

HARVESTER TRUCKS

COMPANY

FISK TRANSPORTATION "Fillerless" CORDS

Blood Will Tell

A saying that is as applicable to a tire as to a human being. If a tire is made of the best materials it proves it in long wear — high mileage — under varied conditions. If it is composed of "shoddy" you soon learn of the deception.

Fisk Transportation "Fillerless" Cords are "Red-blooded" tires because they are composed of only high grade material.

The surest way of proving the superiority of these tires is to place one alongside of any other tire and check its mileage.

Fisk Transportation "Fillerless" Cords are in use today by leading bus fleets throughout the country.

The Fisk Tire Company, Inc.
Chicopee Falls, Mass.



Time to Re-tire Get a Fisk
Trade Mark Reg. U. S. Pat. Off.

LANG BODIES

create new passengers



Lang Craftsmen are graduates both of the old and new schools. Out of their experience they have built into the modern motor coach the friendly goodwill of a past generation.

The entrance to a bus is the first impression that the passenger receives,—it is also the last to be carried away. A low step, a deep, draught-proof well, doors even a little wider than necessary, and a step spotlight,—such carefully planned details as these build patronage by leaving the right impression on passengers.

People who ride once in a Lang Body invariably "ask for more."

Operators of buses with bodies by Lang know that this passenger attractiveness will last through years of grueling service.

THE LANG BODY COMPANY
Cleveland, Ohio

**A FEW OF OUR
PROMINENT
USERS**

Northern Ohio Power
& Light Company
New England Com-
pany
P. R. T. Company
Yellowway Company,
Inc.
Gary Street Railway
Yellow Cab Company,
Montreal
Capitol Traction Com-
pany
Denver, Rio Grande
Interurban Line
O. Townsend — Hast-
ings, Nebr.
White Star Transpor-
tation Company, To-
ronto
North Texas Coach
Company
Mac's Auto Tours—
Los Angeles, Cal.
American Car & Found-
ry Motors Co.



*"After all—
it's the Setting
that counts!"*



For Twenty Six Years

A FACTOR IN TRANSPORTATION



An experience of twenty-six years furnishes the background for the success of Red Seal Continental Motors. During these years the Continental Motors Corporation has been a decided factor in the many phases of automotive transportation. These include the bus field where Red Seal Continental Motors have gained a leading position through superior service to users.

CONTINENTAL MOTORS CORPORATION
Offices: Detroit, Mich., U. S. A. Factories: Detroit and Muskegon
The Largest Exclusive Motor Manufacturer in the World

Continental Motors

The OHMER Ticket-Printing Register

For use on Electric and Steam Railways, Motor-coaches, Ferries, Excursion-boats and Steamships, Toll Bridges, Ticket Offices — wherever fare protection is needed.

Ohmer Fare Reg. Co. Dayton, Ohio	THE PEOPLES TRANSP. CO.		PLEASE RETURN TO OPERATOR		Reg. No. 144
	GOOD ONLY FOR ONE CONTINUOUS PASSAGE BETWEEN STATIONS AS INDICATED BY ARROW		UNFOLDED ON ARRIVAL AT DESTINATION		
	FROM	TO	FARE	CLASS/NUMBER	
	DATE				
OCT 25 1926 6 N 99 \$6.66 MIL 2 2 6 9					



10 Big Features

- 1—Prints Complete Tickets.
- 2—Prints a Record of all Fares Received.
- 3—Prints Station to Station Numbers.
- 4—Prints Direction of Trip.
- 5—Prints identification of operator issuing each ticket.
- 6—Prints date of ticket sale.
- 7—Prints register number.
- 8—Numbers all tickets consecutively.
- 9—Provides locked duplicate record.
- 10—Compact—Light-weight—Portable—Low Cost.

NOW — a New, Revolutionary Fare-Recording Achievement

The Ohmer Ticket-Printing Register

THIS announcement of the amazing new OHMER TICKET-PRINTING REGISTER marks a new era in Transportation Accounting History. For here is a substantial, yet light-weight and compact machine that not only provides a complete secret record of all cash and paper fare transactions, but also actually prints and issues tickets.

The new OHMER TICKET-PRINTING REGISTER is backed by the twenty-seven years' sound experience of America's greatest Fare Protection Specialists. It is ideal for use in Electric and Steam Railway Passenger Service, on Ferries, Excursion Boats, Steamships, Toll Bridges and Ticket Offices.

This new OHMER TICKET-PRINTING REGISTER will reduce your costs, stop your

losses and speed up the operation of your service. It is guaranteed mechanically perfect. It will repay its extremely low cost to you in but a few months' time. A full description of this new Register and of its operation will be furnished to you on request. Write or wire for full particulars—*today!* No cost or obligation.

OHMER FARE REGISTER COMPANY
Dept. Z DAYTON, OHIO, U. S. A.

OHMER

TRANSPORTATION
RECORDING DEVICES

PUT TRANSPORTATION ON A BUSINESS BASIS

BUYERS' INDEX

Air Brakes Westinghouse Air Brake Co.	Brakes, Air Westinghouse Air Brake Co.	Fittings, Air Brake Westinghouse Air Brake Co.	Seats Hale-Kilburn Co.
Axles, Motor Buses, Trucks Timken-Detroit Axle Co., The	Brakes, Electric Westinghouse Air Brake Co.	Headlining, Roofs, Floors Haskelite Mfg. Corp.	Tanks, Air, Gas, etc. Westinghouse Air Brake Co.
Batteries, Lighting Electric Storage Battery Co.	Buses, Motor American Car & Foundry Motors Co. Fageol Motors Co. Graham Bros. International Harvester Co.	Motors, Gasoline Continental Motors Corp.	Tires Firestone Tire & Rubber Co. Fisk Tire Co., Inc., The Goodyear Tire & Rubber Co., Inc.
Batteries, Starting Electric Storage Battery Co.	International Motor Co. Mack Trucks, Inc. Reo Motor Car Co. Studebaker Corp. of America, The White Co., The	Plywood, Panels and Interior Trim Haskelite Mfg. Corp.	Trucks, Industrial Electric Baker-Raulang Co., The
Batteries, Storage Electric Storage Battery Co.	Cars, Auto, Gas & Electric Autocar Co., The	Rail Cars International Motor Co. Mack Trucks, Inc.	Trucks, Motor Autocar Co., The General Motors Truck Co. Graham Bros. International Harvester Co. International Motor Co. Mack Trucks, Inc. Reo Motor Car Co. White Co., The
Batteries, Wet Cell Electric Storage Battery Co.	Engines, Gasoline Continental Motors Corp.	Rattan Hale-Kilburn Co.	
Bodies, Bus Baker-Raulang Co., The Lang Body Co.	Fire Apparatus International Motor Co. Mack Trucks, Inc.	Registers, Fare Ohmer Fare Register Co.	
		Seat Material Hale-Kilburn Co.	

Plywood in bus body construction

One of the important factors in successful motor bus operation is the provision for the safety and comfort of the passengers. HASKELITE, the structural plywood, and PLYMETL, its armored twin, are coming to play a leading part in the construction of bus bodies that are safe, comfortable and economical to operate.

The big advantage of these materials is their unusual combination of strength and lightweight. A HASKELITE roof is stronger than the ordinary T. and G. construction and in many cases weighs less than half as much. PLYMETL side panels $\frac{1}{4}$ in. thick weigh less than 16-gauge steel, are 24 times as stiff, and have 40% more resistance to blows.

A blue print booklet has been prepared describing fully the application of HASKELITE and PLYMETL in bus body construction. A copy will be sent to any railway executive requesting it.

Specify HASKELITE for passenger car head linings.

HASKELITE MANUFACTURING CORPORATION

133 West Washington Boulevard, Chicago

Canadian Representatives:

Railway and Power Engineering Corporation, Ltd.
Montreal Toronto Winnipeg



RA 12-25-Gray

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"FREEDOM FROM TIRE FAILURES EN ROUTE"



One of the Goodyear-equipped fleet of Interstate Stages, Inc., operating daily between Detroit and Chicago

When you have a 280-mile bus run, such as Interstate Stages, Inc., of Detroit, has daily between Detroit and Chicago, you want tire equipment that provides utmost dependability en route.

Mr. E. A. Blake, President of Interstate Stages, Inc., writes that his line has found that kind of equipment in Goodyear Balloon Bus Tires. Mr. Blake's letter reads as follows:

"We have received numerous unsolicited testimonials from people who have enjoyed the riding qualities of Goodyear Balloon Bus Tires, which are standard equipment on all our Fageol Safety Stages, operating daily between Detroit and Chicago, a distance of 280 miles.

"This type of tire has more than met our expectations and is giving wonderful service and freedom from tire failures en route.

"This, in conjunction with their sure-footedness on slippery roads, combined with our air brakes, has earned us the reputation of being the safest and most dependable motor transportation service between these two points."

* * *

You can always depend on Goodyear Tires for active, tractive, economical service on any road.

They are durable. They cushion. And they cost less per tire mile.

* * *

Made with SUPERTWIST, the extra-elastic, extra-enduring fabric developed by Goodyear for Goodyear Pneumatic Tires. Goodyears provide for any motorbus service the last word in bus tire value.

Only Goodyear Tires are made with SUPERTWIST—yet they cost you no more.

More people ride on Goodyear Tires than on any other kind

GOODYEAR

Copyright 1926, by The Goodyear Tire & Rubber Co., Inc.



The Carpenter Steel Company, of Reading, Pa., manufacturers of castings and pipes, use this Model CH 2 1/2-ton Autocar Truck for inter-plant hauling, for local deliveries and also on long-distance work.

Ask the motor truck salesman to show you his local service station

Direct Factory Branches or Affiliated Representatives in 66 Cities

*Albany	*Newark
*Allentown	*New Bedford
Altoona	*New Haven
*Atlanta	*New York
*Atlantic City	*Norfolk
*Baltimore	*Oakland
Binghamton	*Paterson
*Boston	*Philadelphia
*Bronx	*Pittsburgh
*Brooklyn	*Providence
*Buffalo	*Reading
*Camden	*Richmond
*Canton	*Rochester
*Charlotte	*Sacramento
*Chester	*San Diego
*Chicago	*San Francisco
*Cleveland	*San Jose
*Columbus	*Schenectady
Cumberland	Seranton
*Dallas	Shamokin
Denver	*Springfield
*Detroit	*St. Louis
*Erie	*Stockton
*Fall River	*Tampa
*Fresno	Utica
Harrisburg	*Washington
*Indianapolis	West Palm Beach
*Jersey City	Wheeling
Lancaster	Wilkes-Barre
*Lawrence	Williamsport
*Los Angeles	*Wilmington
*Memphis	*Worcester
Miami	York

*Indicates Direct Factory Branch

THE real cost of motor truck operation depends on service more than on any other factor.

Can you get spare parts immediately? Is there trained force of mechanics close by you? What do actual users of the truck you are considering say of the local service? These are some of the most important questions a truck buyer should ask; and he should satisfy himself as to the answers.

Autocar reputation for service is second to none. To-day this carefully developed Autocar Service System operates in sixty-six of the business centers of the United States, through factory owned branches and affiliated representatives.

The Autocar Company, Ardmore, Pa.
ESTABLISHED 1897

Autocar Trucks

